Journal of Electricity and Western Industry

25 Cents a Copy — May 1, 1923 — San Francisco

SANGAMO DEMAND REGISTER

SANGAMO

Service charges, based on maximum demand, can be determined by the Sangamo Demand Attachment, which may be applied to any Type H Sangamo Meter, either single-phase or polyphase. A pointer, moving over the scale at the top of the dial, indicates the maximum rate of power consumption for any given timed time period since the last reading of the meter.

The timing is accomplished by a new type of motor that operates on the reaction principle and runs at a synchronous speed. It has great advantages over the usual induction motor in that its speed is not affected by friction-load or voltage and it varies only directly with the circuit frequency.

The function of the motor is to determine the time interval and reset the recording mechanism at the end of each interval. Standard intervals are 15, 30, 60 minutes.

Sangamo maximum demand dial with timing motor and all necessary mechanism can be used in place of the standard dial by substituting a new upper bearing screw, a bracket and a deeper cover which permits resetting the demand pointer from the outside.

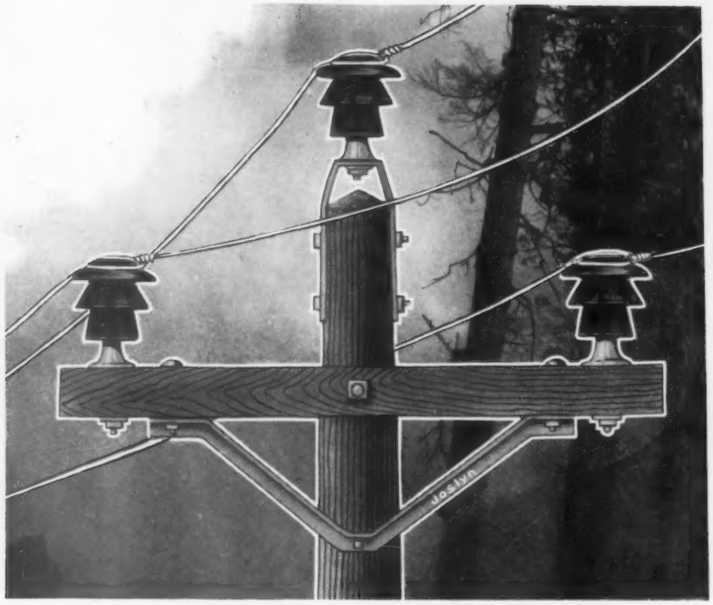
Standard scales read in Kilowatts but in large meters where the Kilowatt-hour scales require constants such as 10, 100, etc., the dial constants apply to the demand scale.

Write for full description and prices.

SANGAMO ELECTRIC COMPA

SPRINGFIELD ILLINOIS USA

Insulator
Perfection
=
Line
Protection



P I N C O

PIN TYPE — SUSPENSION — STRAIN

I N S U L A T O R S

are established as standard with many of the large power companies of the Pacific Coast and in use have justified the reputation of their makers.

MANUFACTURED BY
PORCELAIN INSULATOR CORPORATION
LIMA, N. Y., U. S. A.

Three Complete Stocks Carried by Pacific Coast Distributers

RELY ON LOS ANGELES SEATTLE SAN FRANCISCO SERVICE

Baker-Joslyn Company

183-199 First St.
SAN FRANCISCO

330-332 Azusa St.
LOS ANGELES

2424-28 First Ave. So.
SEATTLE

Distributers
Hot Galvanized Pole Line Hardware
Wood Poles, Cross Arms and Pins
Construction and Linemen's Tools
Porcelain and Glass Insulators
Porcelain Knobs, Tubes and Cleats
Insulated and Bare Copper and Iron Wires
Rigid Iron Conduit and Fittings
Flexible Metallic and Non-metallic Conduit and Armored Conductors
Switches, Switchboards and Fuses
Insulating Materials

Journal of Electricity and Western Industry entered as second class matter February 17, 1921, at the post office at San Francisco, under the Act of Congress, March 3, 1879.
Published the 1st and 15th of each month, at Rialto Building, San Francisco, California.

MAY -8 '23 ©CIB576721

Journal of Electricity and Western Industry

A McGraw-Hill Publication

Established 1887

C. T. HUTCHINSON, Acting Editor

NORMAN S. GALLISON, GEORGE C. TENNEY, Associate Editors

ROBERT SIBLEY, Consulting Editor
CLOTILDE GRUNSKY, Contributing Editor

VOLUME 50 | SAN FRANCISCO, MAY 1, 1923 | NUMBER 9

Contents

EDITORIALS 315

Immigration and the Labor Shortage—Super-Power Survey of the Pacific Northwest—Trite But True, "It Pays to Advertise"—Our New Department Devoted to Electrical Construction—Community Prosperity Determines the Success of the Public Utility—Puncturing the Excessive Cost Bubble in Electric Home Operation—Annual Summer Convention of A.I.E.E. at Swampscott—Plan Better Lighting in Schools to Save Eyes of Youth.

SUPER-POWER SURVEY OF THE PACIFIC NORTHWEST 321

This report was prepared by a group of representative engineers in educational institutions, in private practice and in municipal and private utilities, after an exhaustive survey covering a two-year period, through various engineering organizations acting in conjunction with the Chambers of Commerce of the Northwest. It presents a graphic picture of the present electrical development of Washington, Idaho, and Oregon and its relation to their future growth.

OPERATING COSTS OF AN ELECTRICAL HOME—by H. L. Garbutt 330

Cost of operation has been the specter which stands in the way of the electrification of many homes. In this completely electrified home the cost for current for lights, cooking, hot water, heat and a full line of electric appliances averages $13.88 per month over a three-year period.

A SERVICE FOR THE ELECTRICAL CONTRACTOR 331

Recognizing the need for a common forum for the interchange of ideas in the electrical contracting field, the Journal of Electricity and Western Industry is publishing a series of articles by E. Earl Browne, a recognized authority on electrical construction, the first of which appears in this issue.

Current Comment	318	Meetings	345
Electrical Construction	332	Personals	346
Jobber, Dealer and Sales Agent	335	Manufacturer, Dealer and Jobber Activities	348
Industrial News	340	Trade Outlook	349
Books and Bulletins	344	Construction News	350

PUBLISHED SEMI-MONTHLY BY

McGRAW-HILL COMPANY OF CALIFORNIA — Rialto Building — SAN FRANCISCO

James H. McGraw, *President*
C. T. Hutchinson, *Vice-pres. & Gen. Mgr.*
C. M. Lindsay, *Vice-pres. & Treas.*

WASHINGTON, Colorado Building
CHICAGO, Old Colony Building
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, 10th Ave. and 36th St.

Copyright, 1923, by McGraw-Hill Company of California. Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

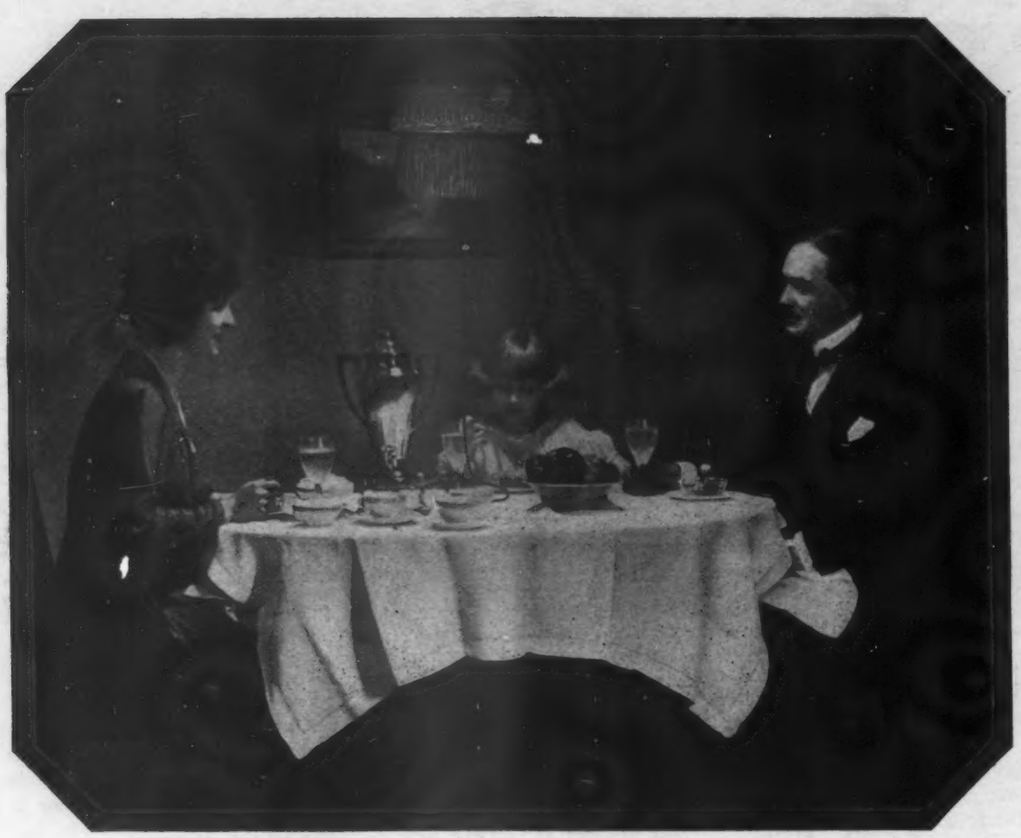
Member Audit Bureau of Circulation
Printed in U. S. A.

McGRAW-HILL CO., Inc., New York
Publishers of

American Machinist—European Edition (*Published in London*)
Industrial Engineer (*Published in Chicago*)
Chemical and Metallurgical Engineering
American Machinist
Ingenieria Internacional
Electrical World
Electric Railway Journal
Engineering and Mining Journal-Press
Bus Transportation
Engineering News Record
Coal Age
Electrical Merchandising
Power

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, $2.50 per year, 2 years $4.00. Elsewhere $4.00 Gold (17 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Please enter my subscription to the "Journal" for 1 ( ), 2 ( ) years, for which please send bill.
(Please print name and address plainly below)



Price is soon forgotten

Price is soon forgotten. You then think about the product itself; its utility, its performance, its resistance to wear and tear.

With only its low price to recommend it the inferior wiring device is apt to cause trouble and lose a customer for you.

But the device that makes good, regardless of its cost, builds good will and increased business.

The initial sale is not the end. It is the beginning of the cycle that should bring your customer and his friends into your store again and again.

Bryant Superior Wiring Devices are the logical initial sale. They start the cycle right.

No. AV-33
BRYANT
Spar-Tap
2 Way Socket
Price $1.00

NO. 651
BRYANT
Appliance
Switch-Plug
Price $1.00

"A Dependable Wiring Device for every Electrical Need"

THE BRYANT ELECTRIC COMPANY

BRIDGEPORT, CONNECTICUT

NEW YORK	CHICAGO	SAN FRANCISCO
342 Madison Ave.	844 West Adams St.	149 New Montgomery St.

Immigration and the Labor Shortage

INDUSTRY has been complaining of a shortage of labor, not so much in the skilled crafts but in so-called "common," or unskilled labor. Judge Elbert H. Gary, of the United States Steel Corporation, has attributed this shortage to the operation of our new immigration laws which limit the number of immigrants admitted into the United States within a year to a certain percentage of foreign born residents already here.

IT WAS the obvious purpose of the immigration laws to limit the influx of foreigners, especially those of a certain type, in order to prevent the competition of "pauper" European labor with that of American citizens whose standards of living demanded relatively high wages. Unquestionably the law has done this, but with a vengeance.

IT LOOKS as if the shrewd political heads governing the affairs of organized labor had put one over on Uncle Sam, American industry, and the American people. In effect, the present immigration laws make of the United States a great closed shop, as far as the rest of the world is concerned, while those in possession of the field, organized labor, with their restrictive regulations regarding apprentices, output, and admission of additional members of the unions, have almost absolute control of the supply of labor, than which a more destructive condition could hardly exist.

FOR many years to come, we must of necessity rely upon Europe for our supply of unskilled labor. The conditions of life in the United States, the rapid industrial development bringing opportunity to all who are willing to exert themselves, bring about a decided upward step educationally and economically with each succeeding generation. The son of the immigrant who worked with his hands is not content to follow in his father's footsteps. There are no unwritten laws of caste, that produce such things as four generations of butlers, or serving maids, a condition that is quite a matter of course in Europe. The history of industry is replete with incidents where many of the leaders of today are the sons or grandsons of uneducated steerage passengers.

MR. GOMPERS is railing at Judge Gary's analysis of the fundamental cause of our labor shortage, but railing does not dissipate facts. Pursued to its ultimate conclusion, we might conceivably look forward to the time when we have an industrial organization consisting of leaders with no one to lead, like the Mexican army, all generals and no privates.

A SANE revision of the immigration laws, by which the undesirables might be weeded out at the source, and that would permit of the admission of a supply of labor sufficient to keep pace with our industrial development is needed, and at once.

Super-Power Survey of the Pacific Northwest

THE Super-Power Survey of the Pacific Northwest, which is published in full in this issue, is one of the most important documents concerning the electrical development of this region that has ever been compiled. Prepared by an impartial committee of representative engineers, after careful study covering a two-year period, the conclusions reached may be regarded as authoritative as well as informing.

The purpose of the report was to obtain reliable data to be made available to the public, to capital, to existing and future operating companies, to industries and to commercial and legislative bodies; and to further industrial development by an attempt to forecast and indicate such methods of power expansion, development and interconnection as may ultimately prove sound. A careful perusal of the document is convincing that the committee has succeeded admirably in its work.

Interesting among the several findings of the committee are the statements that development work has been consistently carried on without unnecessary duplication; that power which can be economically exchanged between the several groups can be carried on over ordinary transmission lines already built or likely to be built in the future; and that super-power construction to save fuel or equalize unbalanced power conditions can be avoided for a long time in the Pacific Northwest.

Should sufficient demand be apparent for this document it will be reprinted and distributed in pamphlet form. Those interested in securing copies should communicate at once with any of the commercial bodies in the states of Oregon, Washington or Idaho.

For purposes of facilitating the mechanical composition of the report, the order of presentation has been changed in publishing. The material appearing under the caption "appendix" was submitted as the introduction, also the illustrations have been furnished by the Journal of Electricity and Western Industry. It was thought by this arrangement that the survey would be made more attractive.

Trite but True, "It Pays to Advertise"

IN "Pickwick Papers" Dickens tells how Sam Weller polished Mr. Pickwick's boots at the Whitehart Hotel with Day & Martin's shoe polish. Carlyle, George Eliot, Tom Hood and Bret Harte in their writings also refer to the polish made by this firm. Yet just a few weeks ago, Day & Martin, one of the oldest and most famous manufacturers of shoe polish, sold out because, as the managing director says, "we didn't keep up our advertising." In former years the company advertised as extensively, perhaps, as any other concern in the country. Its products were so well known that a corps of noted authors made frequent references to them. But someone fell down. They forgot about advertising. They forgot that a product may be famous today and forgotten tomorrow just for a lack of advertising. They paid no heed to the derelicts on the industrial shore that had gone to their doom for the same reason. "Sunny Jim" was a household phrase ten years ago,—forgotten now. There are many other examples which bear out the truth that a product must be kept before the public every day in the year. To witness the passing of one of the old lines may bring a pang of regret, but it also brings home the truth in the statement that "It Pays to Advertise."

Our New Department Devoted to Electrical Construction

THE present chaotic condition of the electrical construction field is due largely to competition on a price basis. Unscrupulous price-cutting has in many cases been ruinous to the contractor and has resulted in unsatisfactory installations from the consumer's point of view. The public is generally ignorant of electrical construction and naturally wants connections and service at a minimum cost. The electrical contractor is often misled as to his costs of doing business and has few means of keeping abreast of the latest methods whereby his costs may be reduced. Where the capacity of lines and number of outlets is cut down to make possible a low contract price, the contractor suffers in that the sale of current consuming devices is checked, and the consumer does not receive the full value of the progress of the electrical art to which he is entitled.

The Journal of Electricity and Western Industry has long realized the need of establishing a department devoted to a discussion of problems of the man engaged in electrical construction. Our task has been to find the right man to conduct such a department. As is formally announced on page 331 of this issue, we have been fortunate in securing a man whom we believe to be exceptionally well fitted to undertake this work. We believe that Mr. Browne's articles will be a distinct contribution to the all too meager literature on this subject.

Every agency profits in proportion to the service it renders. This series of articles should be of incalculable benefit to the electrical contractor. The contractor controls the "neck of the bottle" in the electrical industry. His elevation to a position where he can do dependable quality work at a profit will be reflected in increased sales and increased profits to the rest of the industry.

Community Prosperity Determines the Success of the Public Utility

PUBLIC utility officials realize that the growth and success of their companies is dependent upon the prosperity of the people in the territory which a utility serves. The San Joaquin Light & Power Corporation recently demonstrated its appreciation of this fact in a striking manner. A stock sales campaign for the sale of San Joaquin Light & Power Corporation preferred stock was launched the first week in March after several weeks of preliminary preparation.

The campaign originally was planned to extend over a period of ten months, beginning March 15, to sell to the public $2,000,000 in prior preferred stock. This campaign was getting started nicely when it became evident the drive of the Sun Maid Raisin Growers' Association would require the undivided attention of every investor and individual in the San Joaquin Valley if it was to be made a success.

In line with the support given the Sun Maid Growers' drive by progressive business interests in the San Joaquin Valley, the management of the San Joaquin Light & Power Corporation declared a postponement in the sale of San Joaquin Power Stock for a period of one month. In addition, the power company, through its district officials and by advertisements, further assisted in the refinancing.

While in the final analysis this public utility was best serving itself by assisting the raisin growers, and claims no halo for its actions, nevertheless the important thing is that it saw the opportunity to perform a helpful service to the community and acted immediately.

Puncturing the Excessive Cost Bubble in Electric Home Operation

IF ONE may be permitted to paraphrase a famous saying of Huxley, many an ugly theory is wrecked by a beautiful fact. Mr. H. L. Garbutt has supplied the beautiful fact in his article elsewhere in this issue, on the operating cost of an electrical home.

He points out, justly, that the greatest single obstacle in the way of the electrical home is the element of operating cost. This applies particularly to the range, and electric heating. Heretofore, specific data on this all-important subject have been all too scarce, especially data covering a term of years long enough to be convincing.

The impression has been general that the range and the electric heating appliances are luxuries for the rich only, that only the man of relatively large means can stand the excessive operating cost for the sake of the admitted convenience, flexibility and cleanliness offered by electrical heat.

Here, then, is a specific instance that disproves this theory. A five-room bungalow in San Francisco, based on continuous operation for a period of three years, cost $13.88 per month for electric cooking, heating, lighting, washing ironing, and machine sewing.

Mr. Garbutt has done a real service to the trade in making these figures public. We are indebted to him for this beautiful fact, upon which the ugly theory of excessive cost of operating an electrical home is wrecked.

Annual Summer Convention of A.I.E.E. at Swampscott

ELECTRICAL engineers who will be in the eastern states during June should plan to attend the annual summer convention of the American Institute of Electrical Engineers, from June 25 to 29, when New England's latchstring will hang outside the door at Swampscott, Mass., about fifteen miles from Boston and on the famous North Shore of the Bay State. The local convention committee has been very active in its preparations and has organized an attractive program of work and play for visiting delegates and guests. Local industrial plants, educational institutions and utilities are anticipating visits from many convention attendants; trips to the numerous historic and scenic attractions of eastern Massachusetts are in contemplation, with an attractive program of sports and papers of significance to physical and engineering phases of electrical activity.

The keynote of the convention will be advances in equipment and plant design. Among the subjects to be covered will be modern developments in rectifiers; researches conducted upon the nature of insulation failures; artificial transmission lines; electric plants for commercial radio; transmissions and distribution; a new type of lightning arrester; lamp quality; and street lighting. Electric welding will be considered, and other papers promised which may be included in the schedule, bear upon heat balance and plant economy, duplication of electrical equipment, instrument specifications, and electrical instruments.

Plan Better Lighting in Schools to Save the Eyes of Youth

THE lighting, building, education, health and social agencies of the country have joined hands in an effort to develop a nationally accepted code for school lighting which will correct the conditions partially responsible for the defective vision of 10 to 20 per cent of the school children.

The formulation of this code is being carried on under the auspices of the American Engineering Standards Committee, a federation of national organizations, government departments, and other agencies interested in standardization, whose official approval of a standard or code insures its ultimate acceptance by the principal interests concerned.

The conditions that make such a code necessary have been summarized as follows by a committee of the Illuminating Engineering Society:

"Examinations of thousands of school children, extending over many years, have shown that from ten to twenty per cent of the children suffer from defective vision, the result largely of continued use of the eyes in close work under unhygienic conditions. It is well established that defective vision is progressive and is therefore found to a larger extent among the older children.

"Economically, it is found that, in general, children with defective vision are retarded in their progress in school life, and also enter upon their life work seriously handicapped. It is right, therefore, that a state should concern itself to protect and conserve the vision of children from an economical, as well as a humanitarian standpoint."

The American Engineering Standards Committee has appointed the American Institute of Architects and the Illuminating Engineering Society joint sponsors for the code in school lighting.

CURRENT COMMENT

In its campaign with architects, the Denver Electrical Cooperative League has stressed the point that no matter how large an architectural firm is or how progressive, adequate treatment can not be given to all phases of building lay-out and equipment by the general architect and draftsman, without the assistance of a specialist. This has been found especially true, according to reports of S. W. Bishop, executive manager of the Denver organization, in the handling of electrical matters. Some architects have made it a practice to call in consultation competent electrical contractors, and other skilled engineers, while the majority have depended solely upon the qualifications of the established staff, which in few cases included domestic engineering specialists.

Denver League Starts Campaign with Architects

The League, not wishing to enter into competition with the specialists, has extended its cooperation and help to them as well as to the architects willing to avail themselves of the services of the organization, and it was found that many smaller architects eagerly sought assistance after it was learned that the larger firms were calling on the League.

That there is a growing appreciation of this need of specialized service is reflected in the statement of F. H. Willis, a prominent engineer associated with one of the largest architectural firms in Denver, in the Colorado Engineers Bulletin:

"Fifty years ago an architect was supposed to be an authority on all matters of building construction, but hand-in-hand with the wonderful progress of recent years has arisen such a complication and array of mechanical equipment entering into the average building that today no man may hope to be proficient in all the details thereof.

"Such matters as general power plant equipment, heating, ventilating, plumbing and electrical works, or, in a word, the domestic engineering sciences, constitute a specialty in themselves, the mastery of which, even in a most general way, requires many years of study and practical experience.

"And so, as year by year the confusion and uncertainty as to choice of methods has multiplied, and as the architect himself has been more and more obliged to specialize, leaving many things to his subordinates, there has grown up an insistent demand for a more careful treatment of the engineering features—for a simpler, better and more efficient equipment, and hence, the demand for consulting engineering services.

"And just as it is impossible to find in any one man the training and experience requisite to the perfection of a high-class architect and an equally high-grade engineer, so no one man can ever aspire to proficiency in all the various branches of engineering. That is why the man who engages in consulting domestic engineering practice should adopt a form of organization which will enable him to attract to his staff men who are skilled in different directions, and to sell their services without imposing upon the client the necessity of dealing with a number of engineering heads."

Activity of production and trade, which has been marked since the first of the year, was sustained during March, with records of previous years being steadily approached or exceeded in numerous lines of activity, according to the monthly report on business and agricultural conditions issued by the Federal Reserve Agent of the Federal Reserve Bank of San Francisco. The report states further that labor is fully employed and wages are advancing. Substantial increases in rates of pay in the lumbering, mining and metal trades industries were announced during March. Farmers in many sections are having difficulty in securing adequate help for spring planting and cultural work, because of the relatively low wages paid agricultural laborers. Practically all of the lumber mills of the district are now in operation, and production during March was estimated to be 10 per cent above normal for that month. The volume of orders received and shipments made continued greater than production. Output of the mines of the district increased, the metal market continued active, and prices of the principal metals produced, except silver, rose. Building permits issued during March were greater both in number and value than in any previous month of which there is record. There were 13,358 permits authorizing construction valued at $40,203,440 issued in 20 reporting cities.

Federal Reserve Bank Reports Trade Activity

The general price level continued upward during the month. Prices of many agricultural products of the district, however, are now lower than one year ago, the principal exceptions being wool, cotton, sugar, and barley, all of which are selling at prices considerably above those of April, 1922. Prices for lumber, copper, lead, and zinc advanced during the past month.

Crops and livestock of the district are reported in good condition. The past winter has not been

severe and early spring weather has been generally favorable. Rains during the first week of April ended a six weeks dry spell in California, relieving a situation which was becoming serious.

Utility Uses Directed Wireless for Dispatching

Engineers of the Pacific Gas & Electric Company have put into successful operation what is known as the "Directed Wireless System of Dispatching." Messages were transmitted between the Vaca-Dixon Substation, near Vacaville, to the Pit River power house, some two hundred miles apart. Specially constructed 500-watt sending sets and the standard Kennedy universal receivers were used. Sound waves are transmitted to the high voltage power lines at the point of sending and picked off at the receiving end. These sound waves follow the course of the steel tower lines in a straight line due north one hundred and twenty miles from Vaca-Dixon to Cottonwood, thence on a right angle turn going eighty miles into the Pit region. Tests were made at from 10,300 to 23,000 meters. Under this system of directed wireless the energy or sound wave, is not broadcasted, but travels in the vicinity of the high powered transmission lines, and will not interfere with other sending or receiving stations.

Engineers state that this is the longest system of its kind ever operated. It will be used for transmitting messages between power houses in the mountains and large centers of distribution. This system will be especially valuable in maintaining a continuity of service during heavy storms when telephone lines and other systems of communication are unavailable. The tests were made under the direction of J. P. Jollyman, chief of the division of hydroelectric and transmission engineering of the Pacific Gas & Electric Company.

A similar "wired wireless" or "carrier-current" system of dispatching has been in operation for several months on the lines of the Great Western Power Company between San Francisco and one of the company's main power houses at Caribou, on the Feather River, a distance of 168 miles.

Car Shortage May Hinder Business Revival

The improvement in general business conditions the country over is reflected in the great amount of freight business handled by the railroads in recent months. One of the country's leading authorities on the railroad situation, who recently toured the West investigating railroad conditions, is credited with the statement that * * * business will be restricted by the shortage of transportation unless the public will cooperate by loading all cars to maximum capacity, loading and unloading them promptly and providing more adequate storage facilities for themselves, and that road and building construction material should also be shipped as early in the season as possible.

Despite the fact that the railroads have added considerably to their facilities and equipment and have improved their organization during the past two years they are unable to cope with the situation. For weeks they have been loading well over 900,000 cars of revenue freight per week, an increase of from 13 to 20 per cent as compared to the previous five-years' average for the corresponding weeks. Conservative estimates are that the peak load this year will reach 1,085,000 cars next October—an increase of 7 per cent over the maximum for 1920, the banner year.

No business man can afford to overlook his duty in helping in this crisis. Acute shortage of transportation even if it may not seriously hurt him directly, will so affect general business as to react to the disadvantage of the entire community.

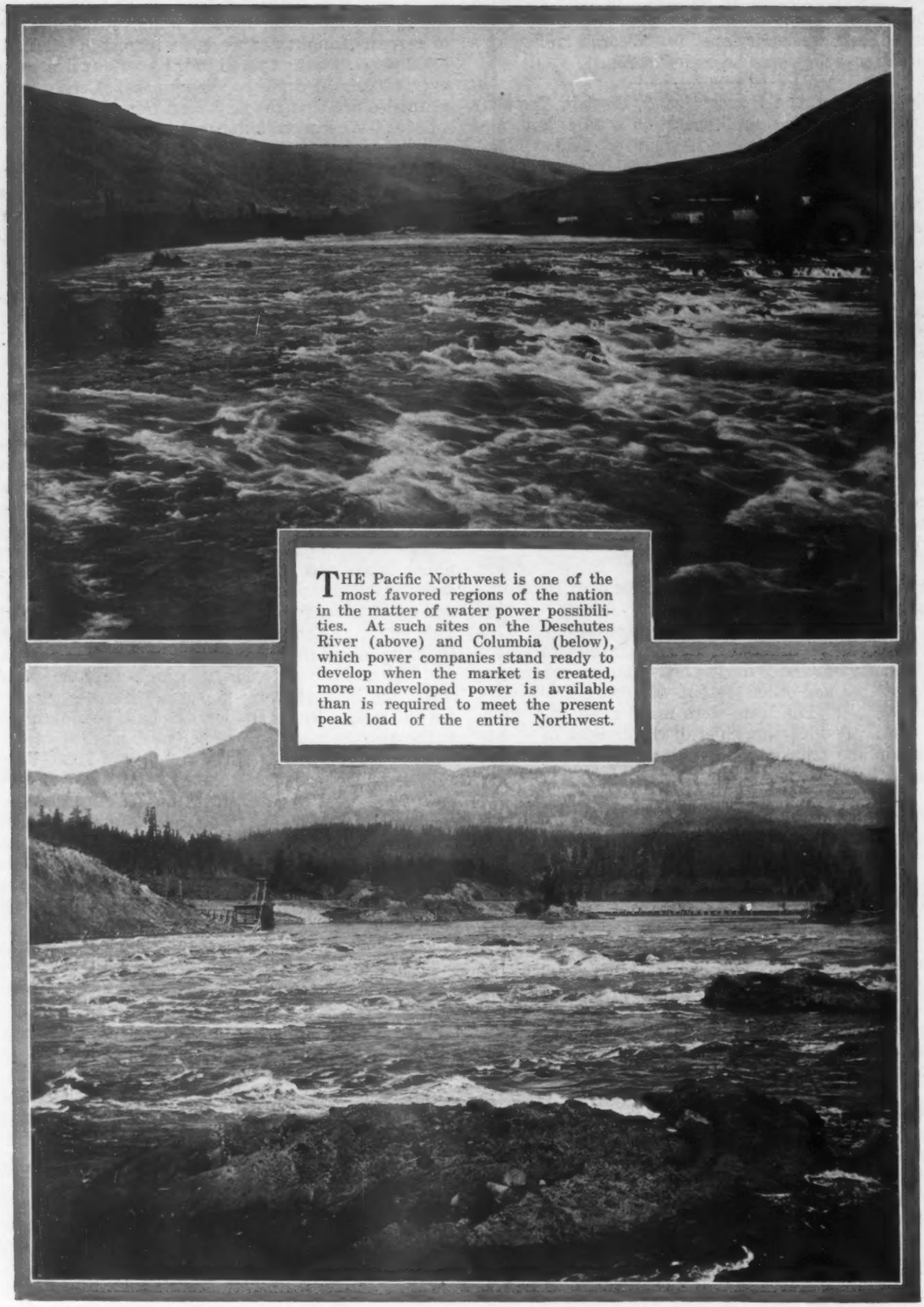
Four Hundred Federal Power Applications

Three applications for permit or license under the Federal water power act were filed with the Commission during the two weeks' period ended March 31, 1923, making a total of 402 received to that date. Application No. 400 was placed by the Western Colorado Power Company, being an application for a license for four of its constructed plants in southwestern Colorado known as the Tacoma, Old and New Ames, Ilium and Ouray projects, on Animas, San Miguel and Uncompaghre Rivers. It has also applied for a license for the sections of its transmission system on public lands and national forests. The combined capacity of the plants is approximately 15,000 hp. and about 180 miles of transmission line are involved. This power system supplies the mines in the region of Durango and the public utility load in that section.

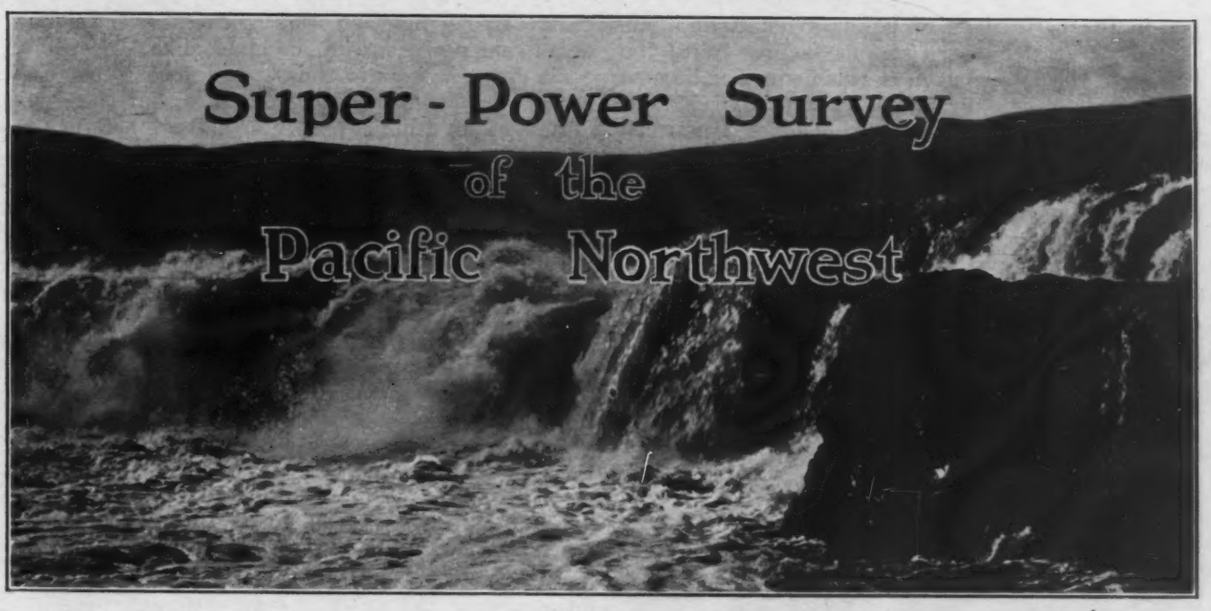
The number of applications for permit or license under the Federal water power act has now passed the 400 mark. These applications have been received at the average rate of three per week since the Commission was organized in the summer of 1920. They aggregate the enormous total of 13,375,000 primary horsepower and involve an estimated installed capacity of 22,154,000 hp., or approximately two-thirds of the total capacity of both water wheels and steam engines used for public-utility and industrial purposes in the United States at the present time. These applications embrace water-power enterprises of all sizes, from individual plants of less than 100 hp. to great interconnected systems involving hundreds of thousands of horsepower.

The Federal Power Commission is entrusted with the responsibility of acting upon these applications and determining to whom authorization for power developments shall be given and upon what conditions. The responsibility of administering interests such as these is one of the great undertakings of our day; but unfortunately it has not stood out with special prominence,—a fact which has resulted in a somewhat inadequate appreciation of its importance.

Although seriously handicapped by lack of personnel and of appropriations—$40,000 only having been given for 1923—the Commission has taken action upon 70 per cent of these applications, one-tenth having had to be indefinitely suspended until further action by state or international agencies, and only one-fifth now await action by the commission.



THE Pacific Northwest is one of the most favored regions of the nation in the matter of water power possibilities. At such sites on the Deschutes River (above) and Columbia (below), which power companies stand ready to develop when the market is created, more undeveloped power is available than is required to meet the present peak load of the entire Northwest.



THE accompanying report was prepared by a group of representative engineers in educational institutions, in private practice and in municipal and private utilities, after an exhaustive survey covering a two-year period, through various engineering organizations acting in conjunction with the Chambers of Commerce of the Northwest. It presents a graphic picture of the present electrical development of Washington, Idaho and Oregon and its relation to their future growth.

THE mountainous character of Washington, Oregon and Idaho combines with the heavy precipitation on the higher altitudes to render the northwestern part of the United States one of the most favored regions in the matter of water power possibilities. A report made a year ago by the U. S. Geological Survey on water power available in various parts of the country shows that the three northwestern states under consideration, having a population of not over 4 per cent, contain water power possibilities amounting to 38 per cent of that of the entire United States. These power possibilities occur both on the steep tributary streams and on the main rivers. The tributaries and the upper portions of main rivers have been logically utilized first by reason of low initial investment, which permitted expansion by successive steps to keep close pace with the steady growth of the power market. The natural expansion of present systems has generally followed in this direction. The general characteristics of developments on the tributary streams are a multiplicity of plants with relatively small flow and high heads, in which the aggregate possibilities are very large. For example, on the lower Deschutes River alone there is more undeveloped power available than is required to meet the present peak load of the entire Northwest.

Recent official reports indicate that there can be made available at known power sites on Clarks Fork, Lower Snake and Columbia Rivers between four and five millions of primary horsepower.

Power on main rivers is to be derived from large volumes of water under relatively low heads. Development of some of the more favorable sites of this character is already under serious consideration.

The importance of great power possibilities in the Pacific Northwest upon its general development can hardly be overestimated. In other parts of the United States limitations of water power possibilities are being sensibly approached, because the cost of power from such developments is so great that it will not compare favorably with the cost of power produced by fuel. On the other hand, the Pacific Northwest is subject to no such limitation and the abundance and reliability of its water powers are vital factors in its commercial, agricultural and industrial expansion, which, as yet, has hardly begun.

By a "Super-power" line is meant a large capacity high voltage transmission line into which practically all plants feed and from which practically all commercial power is drawn. Interconnection of one group with another by ordinary moderate capacity lines for the mutual transfer of energy under sale contracts is not included in the term "Super-power" line. Such connections now exist and it is assumed that the interconnection of the various existing systems will be made whenever there is mutual advantage to be derived therefrom.

Super-power lines involve a large expenditure which can be justified only by unquestionable benefits. These may consist of greater insurance against interruption of service or of lower cost of delivered power.

In the early days of power generation, interruption of service was a serious factor. With the growth of the power business, this factor has become greatly minimized, through interconnection of individual systems and the establishment of a network of transmission lines of sufficient capacity to perform emergency service in case of a local breakdown. It is these networks of lines of varied capacity which have permitted a division of the entire field here considered into five groups. Within each group, every reasonable precaution is being taken to avoid

One of the five Columbia River spans of the Pacific Power & Light Company, length 1,994 ft.

interruption of service. The insurance that now exists against such interruption would not be materially enhanced by the construction of super-power lines.

The cost of delivered power is the result of complex causes. The relative cost of hydro-power development in the various groups as related to the power market possibilities are the important factors which need to be considered in the study of super-power lines.

General competitive conditions have brought reasonable equality in rates in the Pacific Northwest. So far as any differences exist, they cannot be eliminated by the construction of super-power lines, because the burden of their cost must fall upon the groups least favorably situated in this respect and will be reflected in the cost of the power delivered. A resultant lowering of rates in any one group, therefore, could only be expected if the present difference in cost of group production is sufficiently great to exceed by a considerable amount the cost of providing super-power lines. This is not the case in any one instance. There is, however, advantage in exchange of power between groups in minor quantities which explains the construction now proceeding in various directions of group connections by ordinary transmission lines of moderate capacity such as do not come in the class of super-power lines.

A general benefit from super-power lines might be realized in all groups in case a seasonal excess of available hydro-power over market requirements in one or more groups coincided with a shortage in other groups, which would permit wholesale seasonal interchange and result in an improved load factor for all.

Climatic conditions in all groups so far as they control stream flow and seasonal excess over primary or all-year power are in the main alike. There are some differences as to times when floods occur east and west of the Cascade Mountains, but these are differences of a minor character and are not such as to require or permit large exchange of power, were super-power lines built.

To those familiar with Northwestern power conditions, it has long been apparent that the most valid reason for considering super-power connection at all must be sought in the variation throughout the year of power demands as compared with hydro-power supply, and it was this phase of the subject which has received most careful consideration.

The charts shown in Figures 1 and 5 show the seasonal variation of market demands in each group. A comparison clearly establishes the fact that in all but the Snake River group the demands are lowest in midsummer and highest in midwinter, while the power supply is normally the greatest in spring and early summer. No large interchange of power between these groups can be expected under such conditions.

There remains the Snake River group (Fig. 4) with aggregate demands varying relatively little in May, June, July, August and September. During this period the demand is largely affected by irrigation pumping. After the irrigation season it drops off suddenly about 25 per cent, the lessened demand prevailing during the other seven months. It seemed at first, therefore, that a super-power connection between this and the adjoining Upper Columbia group might contain promise of economic benefit.

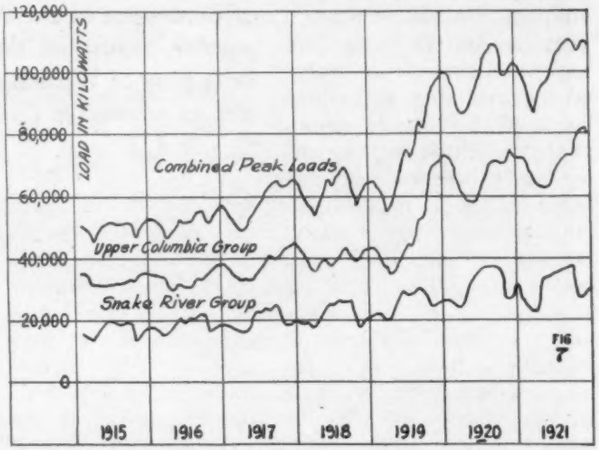


Fig. 7—Comparison of peak loads in Upper Columbia and Snake River groups. The past power demand peaks of the two groups are shown individually and combined.

In order to analyze this question, Fig. 7 was prepared, on which the past power demand peaks of the two groups are shown individually and combined. It was expected that in the combined curve a decided improvement as to seasonal variation would develop, but a glance at this curve will show that the result is disappointing. This is in part owing to the fact that the Snake River load continues high well into September, when the Upper Columbia load is already rapidly ascending to its winter maximum.

A study of consumed power in the two groups shows that, for instance, in a year like 1920, a transfer of power from the Snake to the Upper Columbia group might, so far as market demands are concerned, be beneficial prior to April 1 and after Oct.

Tolt River crossing of the Puget Sound Power & Light Company, span length 1,069 ft.

15, but not between these dates. The maximum exchange for minimizing load variation for each would have been only about 5,000 kw., an amount which must increase very largely before any economic necessity for a super-power line can exist.

The Snake River has seasonal variations coinciding in a general way with those of the power demands. This favorable coincidence may in future be made even closer through stream regulation by storage, thereby further reducing the need of super-power connection.

The group load factors are on the whole favorable and they can and will undoubtedly be improved by hydro-development within each group and by the use of storage. Super-power connection is not necessary for this purpose.

The question should be considered whether in future the limit of feasible power development may be reached in one group long before it is reached in other groups, and whether at such time a super-power connection may be warranted and may, indeed, be required to maintain healthy expansion in all groups. Water power possibilities are both abundant and evenly distributed over the entire territory and in each group there is such enormous excess remaining available, that a group shortage of supply lies too far in the distant future to require consideration at the present time.

It is conceivable that public utilities in one group might be seriously backward in making timely provisions for expansion due to gradually increasing unit cost of development or other causes. Of this, however, there is no evidence. On the contrary, the development steps already definitely planned, as shown in Figs. 1 to 6, and in large part now under way, promise to secure in all parts of the territory an abundance of power, obviating the necessity of super-power connection from this point of view.

The character of power development in the past by the utilization of tributary rather than main streams has been commented on in a previous section. Development on main streams has lagged behind not because of high unit cost but by reason of the heavy initial investment which must generally be incurred even for the production of a small portion of the total power available. The mere cost of power dams alone at such points as Priest Rapids and Celilo Falls on the Columbia River involves the immediate expenditure of many millions of dollars.

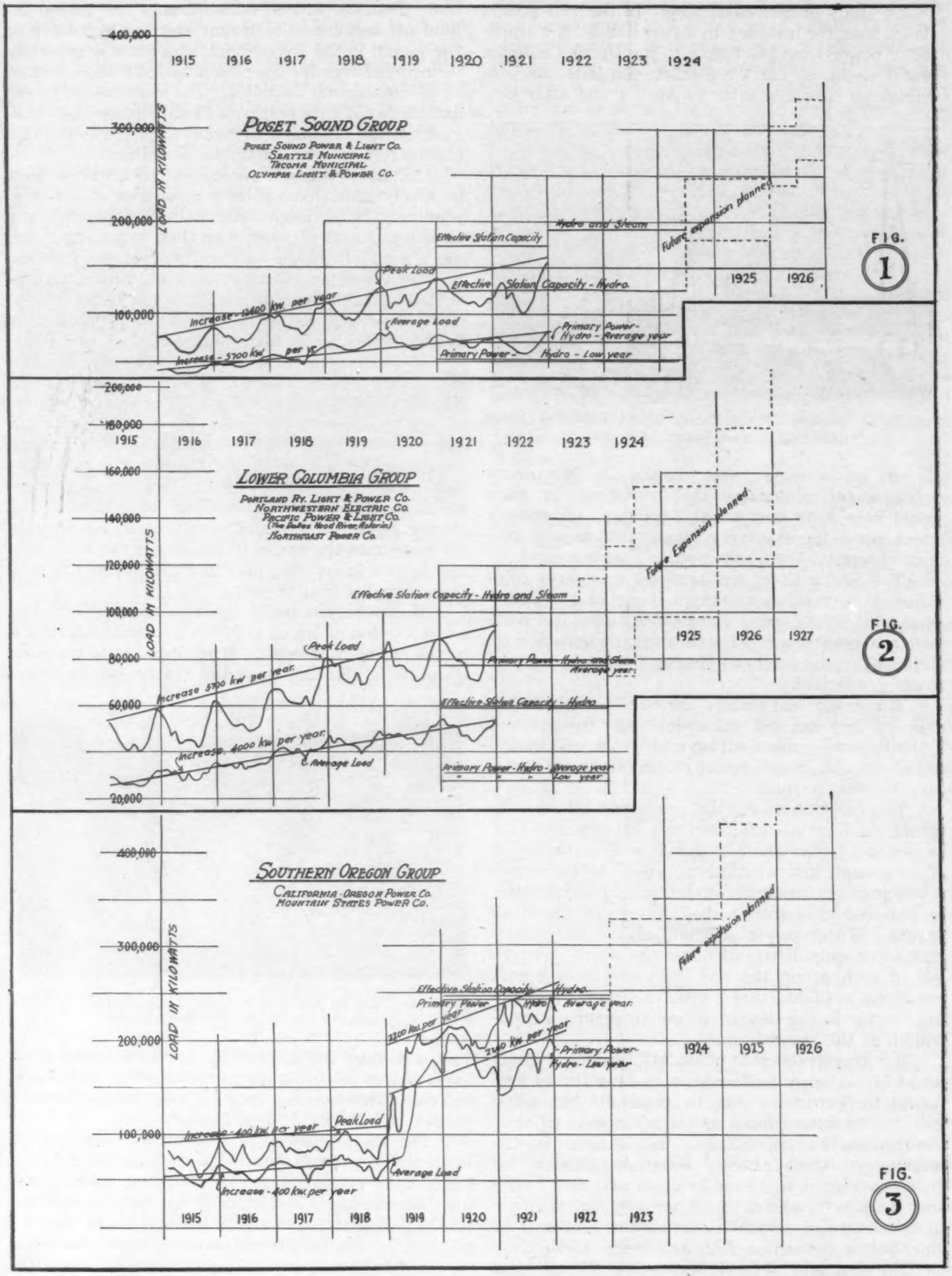
Initial investment on such a large scale cannot be wisely undertaken without assurance of a correspondingly large immediate market. The ordinary commercial uses of power and their rapid expansion are adequately taken care of by existing utilities. Encroachment on existing markets, which, if permitted by public service commissions, might lead to destructive competition, is not a sound basis for financing such great undertakings.

It has become a well understood fact that the magnitude of such enterprises is their most serious present obstacle and that for their successful undertaking special markets must be created from the start. It is hoped that these can be found in a large increase of irrigation pumping and in the establishment near power sites of electro-chemical or electro-metallurgical industries requiring large amounts of electric power. Their commercial feasibility depends far more upon the availability of cheap raw materials and favorable freight rates to consumption markets than upon the cost of power.

Much study is being given to this problem, the early solution of which is of the greatest importance to the entire Northwest. It is desirable to consider its possible influence upon the general power situation and upon the advantage in that connection of super-power lines. So far as the effect of such large individual development upon existing utilities is concerned, it is believed to be favorable.

Shoshone Falls on the Snake River, Idaho, before development by the Idaho Power Company.

The building up of new industries must result in direct or indirect benefit to all. As regards its effect upon general commercial rates, momentary unavoidable excess development may tend to duplication of construction, which in the end would have to be paid by the public and which should therefore be counteracted by controlling state agencies. With sound financing of these large enterprises the momentary excess will be kept within reasonable limits



The charts shown on pages 324 and 325 indicate the seasonal variation in market demands in each group under discussion. A comparison clearly establishes the fact that in all but the Snake River group the demands are lowest in midsummer, and highest in midwinter, while the power supply is normally the greatest in early spring and summer. No large interchange of power between these groups can be expected under such conditions.

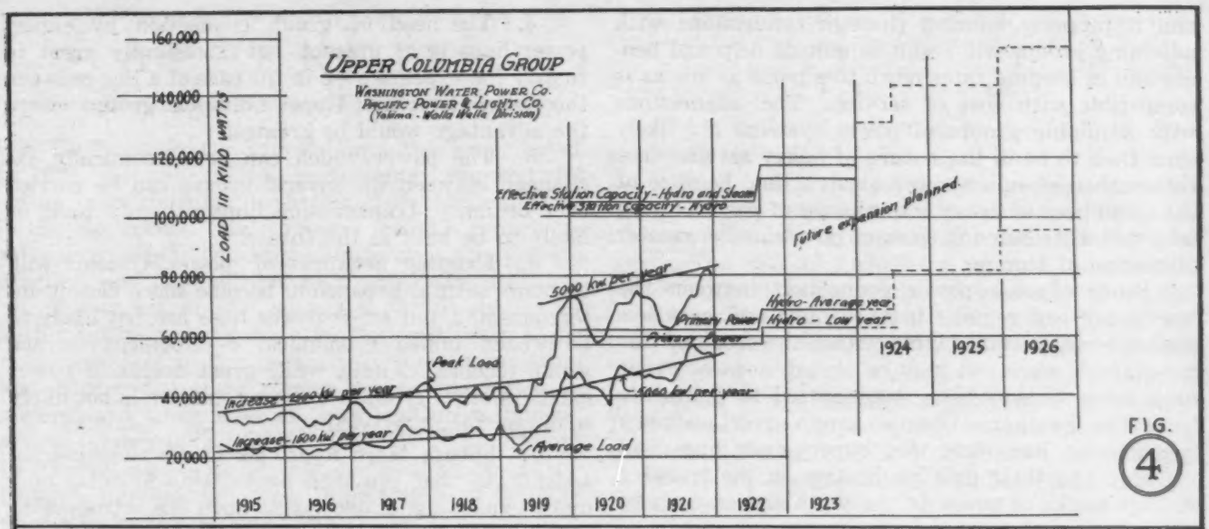


FIG. 4

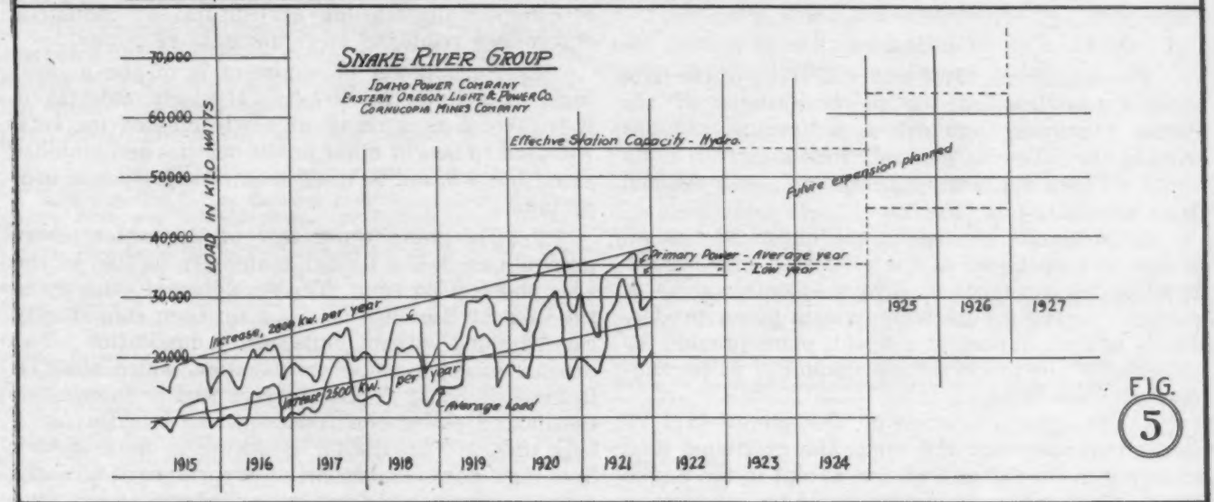


FIG. 5

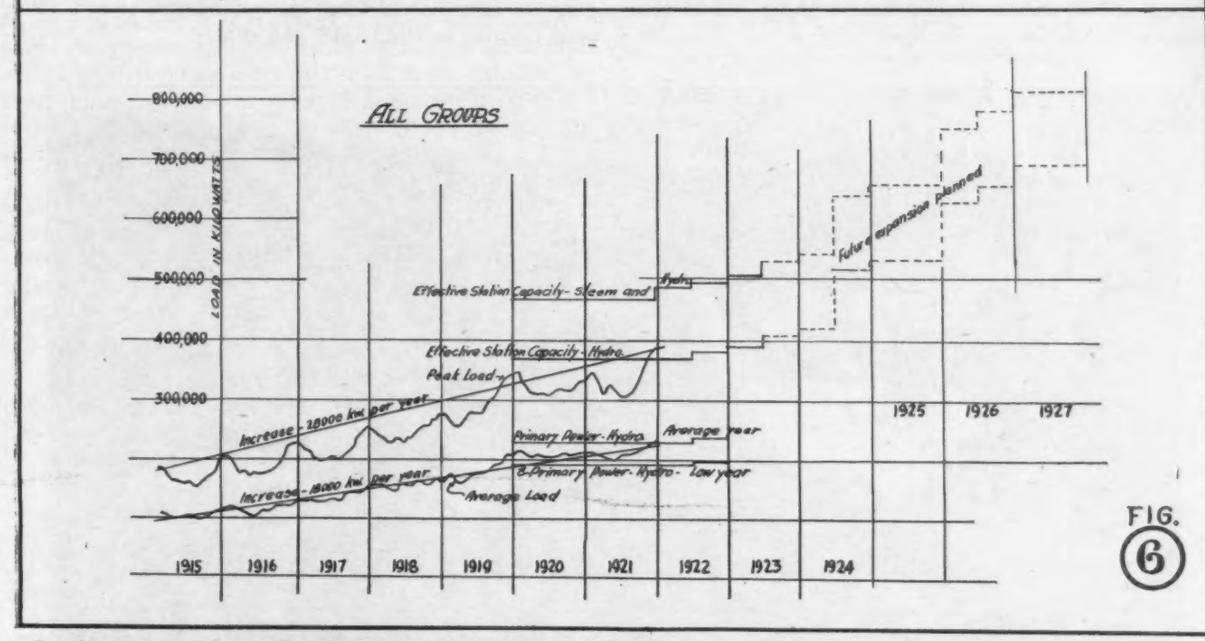


FIG. 6

Development steps, providing for future expansion, are definitely planned, and are in a large part now under way, as is shown in Figs. 1 to 6. These provisions promise to secure in all parts of the territory an abundance of power, obviating the necessity of a super-power connection caused by a group shortage. Water power possibilities are abundant and evenly distributed over the entire territory and in each group there is an enormous excess available.

and if properly handled through connections with adjoining groups will result in mutual help and benefit and in keeping rates down to a point as low as is compatible with cost of service. The connections with adjoining groups of power systems are likely even then to be in the nature of heavy service lines rather than of super-power construction, because of the small need of heavy interchange of power, owing to a well distributed surplus of power and a greater utilization of storage.

Study of super-power connection between the Northwest and regions to the south and east has not been considered as lying within the scope of this committee's work. It may be stated, however, that some power is now being transmitted to California from the Southern Oregon group over ordinary transmission lines, and that super-power lines will probably find their first application in the transfer of large blocks of power to the south and east where water power is less abundant.

Conclusions

The committee, after a careful study of the data secured, has classified the power systems of the Pacific Northwest into five major groups and has reached the following general conclusions:

1. There is a healthy increase of power demand in all groups.

2. Adequate provisions are under way in all groups to keep ahead of the estimated growing demand by the construction of hydro-plants and water storage. In the groups where steam power production is now an important element, plans provide for reduction of the proportionate amount of power supplied by steam.

3. The characteristics of the power load of each group are much the same, the maximum load occurring in the fall and winter, except in the Snake River group, where irrigation pumping produces a summer peak.

4. The need of group connection by super-power lines is at present not sufficiently great to justify the expense even in the case of a line between the Snake River and Upper Columbia groups where the advantage would be greatest.

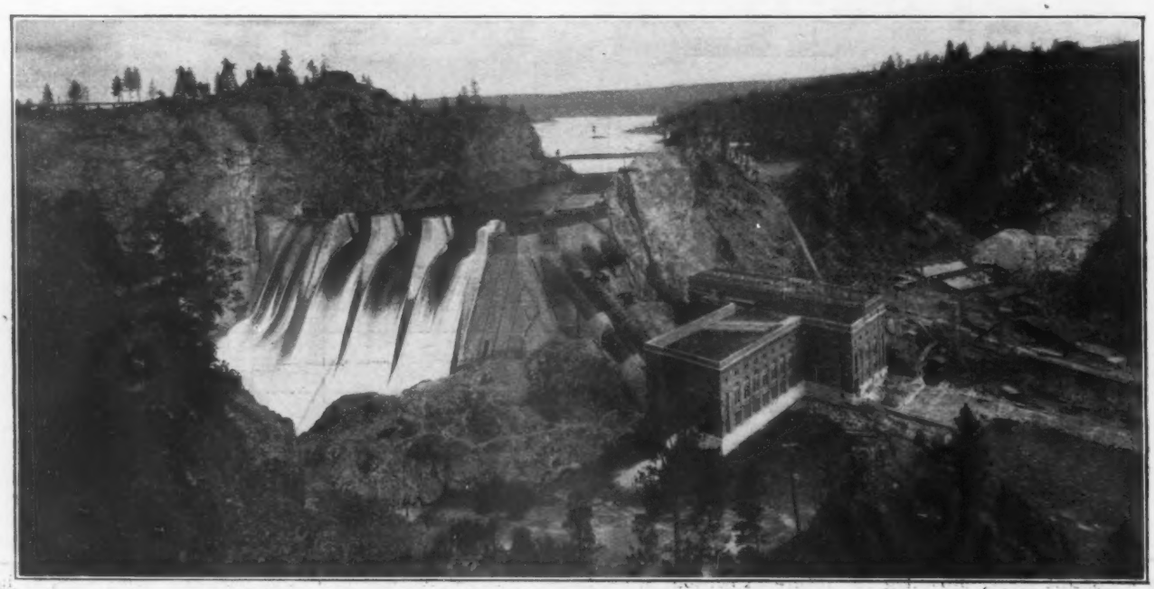
5. The power which can be economically exchanged between the several groups can be carried over ordinary transmission lines already built or likely to be built in the future.

6. Existing networks of power systems will, through natural expansion, become more closely interconnected, but super-power lines are not likely to be needed unless economical development in one group reaches its limit while great excess of power exists in other groups. Such a condition is not likely to obtain for many years.

7. Future large hydro-power development, in addition to that provided by existing systems normally expanding, is dependent upon the introduction of commercially feasible agricultural or industrial enterprises requiring large amounts of power.

8. Such power development is of the highest importance to the Northwest. If wisely undertaken, it will come as a result of newly created markets, will tend to benefit other public utilities and stabilize rates, but will not in itself require super-power connection.

9. Thirty-eight per cent of the water power possibilities in the United States are located in the area under discussion. The development work up to the present time has in the main been consistently carried along without unnecessary duplication. The expense of super-power construction, which must be incurred in other regions to save fuel or to equalize unbalanced power conditions, can be avoided for a long time in the Pacific Northwest. Super-power lines may, however, become of importance at an early date to carry power from our abundance to less favored regions to the south and east.



The Long Lake power station of the Washington Water Power Company, located at Long Lake, Washington, is the largest generating station in the district covered by the report. The installed capacity is 70,000 hp. of electrical energy.

APPENDIX

The Super-Power Survey Committee was created in 1921, through various engineering organizations acting in conjunction with Chambers of Commerce in the Northwest. Its personnel includes representative engineers in educational institutions, in private practice, and in municipal and corporation utilities.

The object of the survey is—"to obtain an authoritative and reliable compilation of data to be made available to the public, to capital, to existing and future operating companies, to industries in general and to commercial and legislative bodies; and to further industrial development by an attempt to forecast and indicate such methods of power expansion, development, and interconnection as may ultimately prove sound."

The committee members have served without compensation, and have defrayed all expenses connected with the work except for drafting and printing which was paid by the Portland Chamber of Commerce. The personnel of the committee follows:

SUPER-POWER SURVEY COMMITTEE

D. C. Henny, Consulting Engineer; J. C. Stevens, Consulting Engineer; F. H. Murphy, Portland Railway, Light & Power Co.; W. H. Crawford, Portland Chamber of Commerce; L. T. Merwin, Northwestern Electric Co.; Llewellyn Evans, City of Tacoma; R. M. Boykin, North Coast Power Co.; F. F. Henshaw, U. S. Geological Survey; H. H. Schoolfield, Pacific Power & Light Co.; R. H. Dearborn, Oregon Agricultural College; J. B. Fisken, Washington Water Power Co; G. L. Parker, U. S. Geological Survey; R. B. Childs, Intermountain Power Co.; E. W. Lazell, Consulting Engineer; C. P. Osborne, Portland Railway, Light & Power Co.; R. K. Tiffany, Consulting Engineer; W. R. Putnam, Idaho Power Co.; E. R. Cunningham, S. P. & S. Ry. Co.; J. P. Growden, City of Seattle; G. E. Quinan, Puget Sound Power & Light Co.; Joseph Jacobs, Consulting Engineer; R. Beeuwkes, C. M. & St. P. Ry.; R. M. Jennings, Douglas County Light & Water Co.; C. E. Magnusson, University of Washington; F. Urban, C M. & St. P. Ry.; R. U. Steelquist, Mountain States Power Co.; W. M. Shepard, The California Oregon Power Co.; H. V. Carpenter, State College of Washington.

Data on which this report is based were secured through questionnaires sent to each municipal and public utility. The cooperation of these utilities in furnishing information desired has been very commendable and this occasion is taken to extend to them the thanks of the committee.

The field comprised in the study covers the states of Washington, Idaho and Oregon. Power developments in these states naturally divide themselves into five groups, within each of which power plants are interconnected or can be connected at slight expense.

Power Generated

Data have been secured from utilities producing over 90 per cent of the total power generated. Utilities which have sent in complete reports are listed in five major groups as follows:

1. Puget Sound Group: City of Seattle, City of Tacoma, Puget Sound Power & Light Co., and Olympia Light & Power Co.

2. Upper Columbia Group: Washington Water Power Co. and Pacific Power & Light Co. (Yakima-Walla Walla Division).

3. Lower Columbia Group: Portland Railway, Light & Power Co., Northwestern Electric Co., Pacific Power & Light Co. (the Dalles-Hood River and Astoria Divisions), and North Coast Power Co.

4. Snake River Group: Idaho Power Co., Eastern Oregon Light & Power Co., and Cornucopia Mines Co.

5. Southern Oregon Group: The California Oregon Power Co. and Mountain States Power Co.

These data are presented in the form of diagrams as follows:

Figs. 1 to 6, inclusive, give the average load and the maximum load per month (one-hour peak) in kilowatts for each group and for the entire Northwest. The rate of growth in demand for average and maximum loads is also given, as well as the provisions planned for future demands. The terms used on the drawings have the following significance:

"Effective Station Capacity" is the capacity of generation of the installed equipment in kilowatts. It is usually the capacity of the generators for a continuous run of one hour as limited by turbines or boilers, or the generators themselves, but not by water supply.

"Primary Power—Average Year" is the effective station capacity of hydro-plants as limited by water supply during the average water year.

"Primary Power—Low Year" is the effective station capacity of hydro-plants as limited by water supply during a low water year.

The total average rate of generation in 1921 for all groups was 210,000 kw. and the peak load was 392,000 kw., giving an annual load factor of 54 per cent.

Table I shows the average load conditions by groups for the year 1921:

Table I—Average Load Conditions by Groups—1921

Group	Average Load	Peak Load	Annual Load Factor
Puget Sound	68,000 kw.	156,000 kw.	44%
Lower Columbia	50,000	92,000	54
Southern Oregon	17,000	25,000	68
Upper Columbia	51,000	82,000	62
Snake River	24,000	37,000	65
All Groups	210,000 kw.	392,000 kw.	54%

Table II gives the total power in kilowatt-hours generated in each group during 1921, both by steam and hydro-plants:

Table II—Total Power Generated—1921

Group	Power Generated—Kilowatt Hours Steam	Hydro	Total	Steam % of Total
Puget Sound	30,493,000	561,534,000	592,027,000	5.2
Lower Columbia	73,410,000	360,416,000	433,826,000	16.8
Southern Oregon	11,350,000	152,020,000	163,370,000	6.9
Upper Columbia	61,000	443,838,000	443,899,000	.015
Snake River	1,260,000	202,018,000	203,278,000	1.6
All Groups	116,574,000	1,719,826,000	1,836,400,000	6.3

The total energy generated in 1921 in all groups, as reported, was nearly two billion kilowatt-hours. To produce the amount of energy by coal which is now produced by hydraulic power would require the consumption of about two million tons annually.

Growth of Power Demand

The rate of the growth of power demand for the years 1915 and 1921, inclusive, is shown on the drawings for each group. In all groups there was a general increase in the load during 1919 over previ-

TABLE V—Plants in Operation May 1, 1923

Number on Map	Plant and Owner	Installed Generating Capacity (Horsepower) Hydro	Steam
	PUGET SOUND GROUP		
	Puget Sound Power & Light Co.		
1	Bellingham	.....	2,670
2	Nooksack	2,000	.....
3	Everett	.....	2,000
4	Post Street	.....	4,670
5	Georgetown	.....	30,670
6	White River	61,330	.....
7	Snoqualmie	26,700	.....
8	Puyallup	26,700	.....
	Washington Power, Light & Water Co.		
9	Anacortes	.....	930
	Northwestern Power & Manufacturing Co.		
10	Elwha	16,000	.....
	Clear Lake Lumber Co.		
11	Clear Lake	.....	2,300
12	City of Index	.....	120
	Washington Coast Utilities Co.		
13	Arlington	270	.....
14	Stanwood	.....	100
	North Pacific Public Service Co.		
15	Bremerton	.....	430
	Sultan Electric Co.		
16	McCoy Creek	150	.....
	Granite Falls Electric Light Co.		
17	Pilchuck Creek	100	.....
	City of Seattle		
18	Lake Union	2,000	.....
19	Lake Union	.....	46,670
20	Cedar Falls	33,300	.....
	City of Tacoma		
21	Nisqually	32,000	.....
22	Dock Street	.....	12,000
	Olympia Light & Power Co.		
23	Olympia	1,600	.....
	Shelton Light & Power Co.		
24	Shelton	100	.....
	Total Puget Sound Group	202,250	102,560
	LOWER COLUMBIA GROUP		
	Grays Harbor Railway & Light Co.		
1	Aberdeen	.....	3,100
	Northwest Electric & Waterworks Co.		
2	Cloquallum Creek	200	.....
3	Silvia Creek	270	.....
	Washington Coast Utilities Co.		
4	Montesano Hydro	270	.....
5	Montesano Steam	.....	670
	Willapa Electric Co.		
6	Raymond	.....	1,330
7	Smith Creek	150	.....
	Willapa Power Co.		
8	South Bend	.....	630
	Central Light & Manufacturing Co.		
9	Pe Ell	300	.....
	North Shore Light & Power Co.		
10	Ilwaco	.....	280
	North Coast Power Co.		
11	Chehalis	.....	2,000
12	Kalama	980	.....
	Northern Clarke County Light & Power Co.		
13	Yacolt	100	.....
	Western Light & Power Co.		
14	Washougal	330	.....
	Skamania Light & Power Co.		
15	Stevenson	100	.....
	Pacific Power & Light Co.		
16	Goldendale	250	.....
17	Husum	100	.....
18	Astoria	.....	1,500
19	Young's Bay	.....	4,000
20	Tucker's Bridge	400	.....
21	Powerdale	8,000	.....
22	White River	3,000	.....
	Northwestern Electric Co.		
23	Condit	18,000	.....
24	Pittock	.....	5,000
25	Portland—Lincoln Street	.....	13,300
	Portland Railway Light & Power Co.		
26	Oregon City, "B"	9,850	.....
27	Cazadero, "G"	19,800	.....
28	Estacada, "M"	13,300	.....
29	Bull Run, "O"	28,200	.....
30	East Lincoln St., "L"	.....	24,800
31	Front and Nicolai, "E"	.....	15,400
32	Silverton	350	.....
33	Salem	.....	3,300
	Coast Power Co.		
34	Tillamook	.....	750
35	**City of McMinnville**	600	500
	Oregon Iron & Steel Co.		
36	Oswego Lake	700	.....
37	**City of Forest Grove**	.....	130
	Sheridan Light & Power Co.		
38	Sheridan	.....	300
	St. Helens Light & Power Co.		
39	St. Helens	.....	270
	Tualatin Valley Electric Co.		
40	Sherwood	.....	120
	Stayton Light & Power Co.		
41	Stayton	.....	120
	Molalla Electric Co.		
42	Canby	270	.....
	Bend Water, Light & Power Co.		
43	Bend Hydro	1,440	.....
44	North Canal Dam	600	.....
45	Bend Steam	.....	1,300
	Deschutes Power Co.		
46	Cove	730	.....
47	Cline Falls	450	.....
	Heppner Light & Water Co.		
48	Heppner	200	.....
	Prairie Power Co.		
49	Prairie City	660	.....
50	**City of Arlington**	.....	200
	Total for Lower Columbia Group	109,600	81,500

Number on Map	Plant and Owner	Installed Generating Capacity (Horsepower) Hydro	Steam
	SOUTHERN OREGON GROUP		
	Florence Electric Co.		
1	Florence	.....	130
	Yaquina Electric Co.		
2	Newport	.....	130
3	**City of Bandon**	130	.....
	Mountain States Power Co.		
4	Marshfield	.....	6,600
5	Albany	520	.....
6	Springfield	.....	4,000
7	Dallas	.....	1,100
8	**City of Eugene**	2,400	.....
	Cottage Grove Electric Co.		
9	Cottage Grove	.....	480
	Lebanon Electric Light & Water Co.		
10	Lebanon	.....	130
11	**City of Jefferson**	180	.....
	Douglas County Light & Water Co.		
12	Winchester	1,900	.....
13	**City of Ashland**	400	.....
	The California-Oregon Power Co.		
14	Gold Ray	2,080	.....
15	Prospect	7,000	.....
16	Klamath Falls	1,000	.....
17	Shasta River	600	.....
18	Fall Creek	4,300	.....
19	Copco	37,200	.....
	Keno Power Co.		
20	Keno	580	.....
	Total for Southern Oregon Group	58,290	12,570
	UPPER COLUMBIA GROUP		
	Okanogan Valley Power Co.		
1	Oroville	2,500	.....
	Chelan Falls Power Co.		
2	Chelan	960	.....
	Great Northern Railway Co.		
3	Leavenworth	10,000	.....
	Tumwater Light & Power Co.		
4	Leavenworth	270	.....
	Washington Coast Utilities Co.		
5	Wenatchee	1,600	.....
6	Wenatchee	.....	2,500
7	Entiat	1,270	.....
	Northwestern Improvement Co.		
8	Roslyn	.....	2,570
9	**City of Ellensburg**	1,600	.....
	Black Rock Irrigation & Power Co.		
10	Priest Rapids	2,400	.....
	Pacific Power & Light Co.		
11	Naches Hydro	10,000	.....
12	Naches Steam	.....	2,670
13	Naches Drop	1,900	.....
14	Yakima	400	.....
15	Kennewick	.....	670
16	Pomeroy	.....	100
17	Walla Walla River	3,700	.....
18	Walla Walla	.....	1,330
	Starbuck Electric Co.		
19	Starbuck	130	.....
	Washtucna Electric Light & Power Co.		
20	Washtucna	120	.....
21	**City of Milton**	440	.....
	Washington-Idaho Light & Power Co.		
22	Asotin	2,450	.....
	Washington Water Power Co.		
23	Post Falls	15,000	.....
24	Upper Falls	15,000	.....
25	Monroe Street	12,000	.....
26	Long Lake	70,000	.....
27	Little Falls	28,000	.....
	Spokane & Eastern Power & Light Co.		
28	Ninemile	16,000	.....
	Little Spokane Light & Power Co.		
29	Milan	240	.....
	Stevens County Light & Power Co.		
30	Colville	1,600	.....
	Kulzer Electric System		
31	Valley	110	.....
	Republic Light & Power Co.		
32	Republic Hydro	800	.....
33	Republic Steam	.....	100
	Hermiston Light & Power Co.		
34	Hermiston	200	.....
	Total for Upper Columbia Group	198,690	9,940
	SNAKE RIVER GROUP		
	Enterprise Electric Co.		
1	Wallowa Lake	1,150	.....
	Eastern Oregon Light & Power Co.		
2	Cove	400	.....
3	Morgan Lake	500	.....
4	Rock Creek	1,060	.....
5	Freemont	1,460	.....
6	South Baker	.....	500
7	**City of Baker**	130	.....
	Cornucopia Mines Co.		
8	"A" and "B"	1,000	.....
	Idaho Power Co.		
9	Oxbow	2,500	.....
10	Horseshoe Bend	2,000	.....
11	Barber	1,200	.....
12	Swan Falls	15,000	.....
13	Malad River	7,300	.....
14	Lower Salmon	10,000	.....
15	Thousand Springs	13,000	.....
16	Shoshone Falls	16,500	.....
17	American Falls	6,700	.....
	Sumpter Power & Light Co.		
18	Sumpter	.....	200
	Total for Snake River Group	79,900	700
	GRAND TOTAL	648,730	208,270
	TOTAL INSTALLED GENERATING CAPACITY, STEAM AND HYDRO		**857,000 h.p.**

ous years, followed by slight drops in 1920. Evidences of a general recovery in 1921 are also apparent.

Table III summarizes the rate of growth in power demand:

Table III—Summary of Rate of Growth in Power Demand

Group	Period	Increase per Year Average Load	Peak Load
Puget Sound	1915–1921	5,700 kw.	12,400 kw.
Lower Columbia	1915–1921	4,000	5,700
Southern Oregon	1915–1918	400	400
Southern Oregon	1919–1921	2,200	2,200
Upper Columbia	1915–1918	1,500	2,500
Upper Columbia	1919–1921	5,000	5,000
Snake River	1915–1921	2,500	2,800
All Groups	1915–1921	18,000 kw.	28,000 kw.

The average load for the Northwest has nearly doubled in the past 5 years. The increase during the past 7 years was 122 per cent.

Provision for Future Growth

The drawings give the present effective station capacity for hydro-plants and for hydro and steam, and the increases that are planned to take care of the growing demand. The following table summarizes these data for all groups as of 1922:

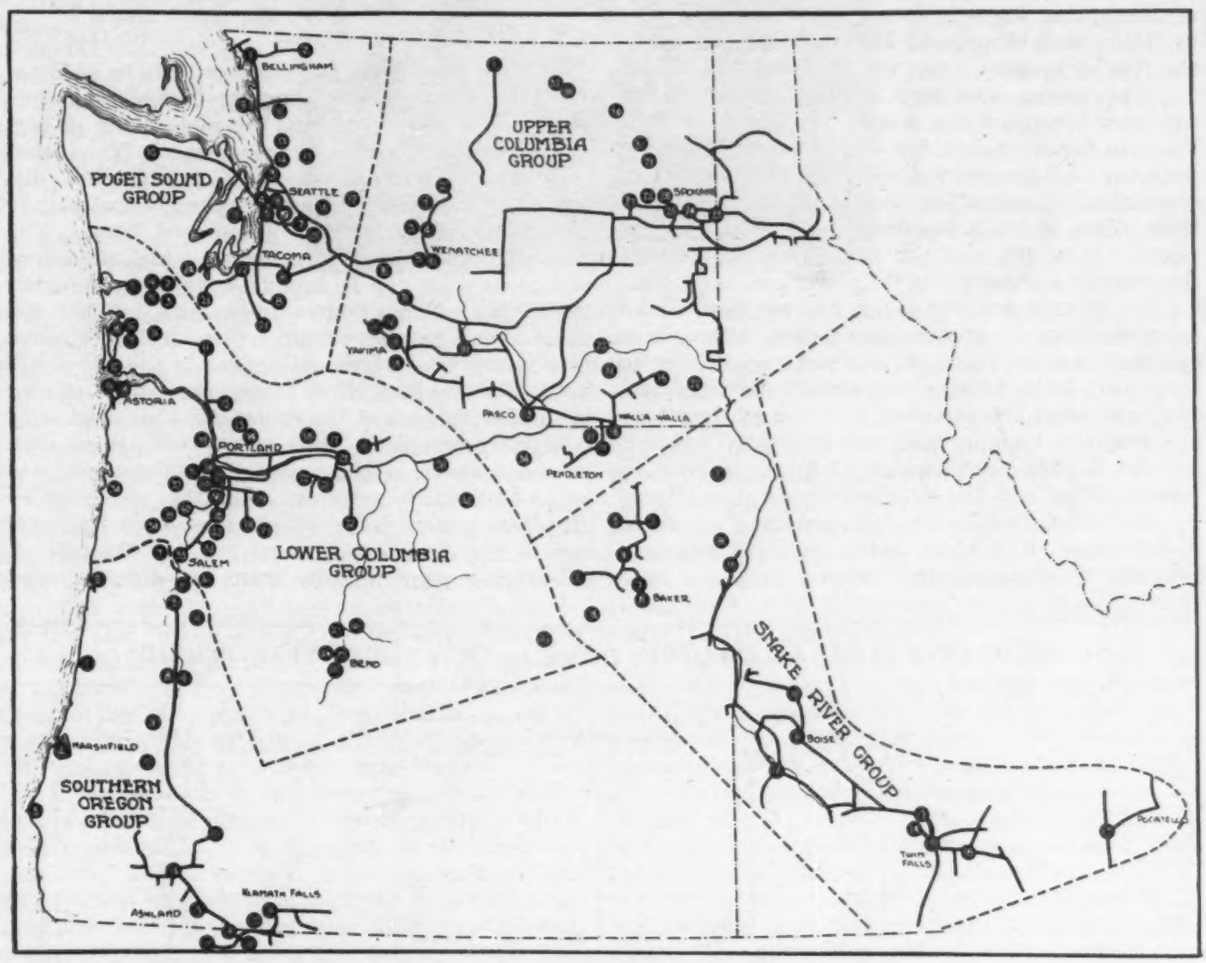
Present effective station capacity —hydro	377,000 kw.
Present effective station capacity —hydro and steam	492,000 "
Present primary power—average year—hydro	232,000 "
Present primary power—low year —hydro	194,000 "
Present primary power—average year—hydro and steam	347,000 "
Present primary power—low year —hydro and steam	309,000 "

The probable effective station capacity on basis of present development plans is shown in Table IV:

Table IV—Probable Effective Station Capacity

Group	Peak Load	Probable Future Effective Station Hydro and Steam Capacity in Thousands of Kilowatts at end of Year				
	1921	1923	1924	1925	1926	1927
Puget Sound	156	192	248	248	332	332
Lower Columbia	92	115	154	154	179	204
Southern Oregon	25	33	33	43	45	45
Upper Columbia	82	135	143	143	156	156
Snake River	37	54	54	63	63	74
All Groups	392	529	632	651	775	811

Accompanying this report is a map of the Pacific Northwest showing the location of the more important commercial power plants and the general system of connecting transmission lines as they existed on May 1, 1923. The numbers refer to plants as listed in Table V.



Map of the Pacific Northwest, showing the location of the more important commercial power plants and the general system of connecting transmission lines as they existed on May 1, 1923. The plants numbered on the map correspond with the table on the opposite page.

Operating Costs of an Electrical Home

By H. L. Garbutt
Merchandising Manager, Westinghouse Electric & Manufacturing Co., San Francisco

COST of operation is the specter which stands in the way of the electrification of many homes. In this completely electrified home the cost of current for lights, cooking, hot water, heat and a full line of electric appliances averages $13.88 per month over a three-year period.

IS AN electrical home an expensive luxury? In its advertising, in its literature and in its sales arguments, the electrical industry assures the public that such is not the case, but the majority of these statements have lacked weight because they have not been based upon actual cost data under home conditions. A quarter of a million people in California have inspected electrically equipped homes. They have been told of the multiple conveniences, of electrical appliances and have accepted the iron, vacuum cleaner, washing machine, percolator and other devices as necessities in the equipment of a modern home. They are ready to believe that electricity is more desirable than other fuels for cooking and heating on account of its cleanliness, dependability, ease of adjustment and efficiency, but they have not been converted to a complete electrification of the home on account of the fearful bugaboo—cost of operation.

The writer, who owns a completely electrified five-room bungalow at 6 Allston Way, west of Twin Peaks in San Francisco, has kept a careful record of costs over a 3-year period and finds electricity to be economical. Current has been supplied for the past three years at the prevailing rates. In the accompanying table the cost per month was taken from the monthly statements of the power company. During the three years, the house has not been closed for more than three consecutive days. The meals prepared have averaged sixteen per week. Prior to December, 1921, heating was done with wood and coal (oak wood $20 per cord, soft coal $20 per ton) in a fireplace, together with two 600-watt Cozyglow portable heaters. Subsequently 7 kw. in air heaters were installed and the fireplace closed.

The prevailing rates for operating an 8-kw. electric range, air heaters, lights and a full and complete line of appliances have been 8 cents per kilowatt-hour for the first 30 kw-hr., 3½ cents per kilowatt-hour for the next 130 kw-hr., and 2 cents per kilowatt-hour for all over 160 kw-hr. The rates for operating the 1,500-watt thermostatically controlled water heater were $2.50 per month plus 3 mills per kilowatt-hour.

On the basis of these rates, it is seen from the table that the costs for the various phases of electrical service in this five-room house for a family of three were:

Average cost per month for water heating	$4.11
Average cost for cooking, lighting and operating two 600-watt air heaters and a complete line of appliances	6.15
Average cost per month to operate 7 kw. in air heaters	3.62
Average cost per month for cooking, heating, lighting, washing, ironing and machine sewing	13.88

From this dollars and cents cost can be deducted the saving in time and labor, the cost of repainting the kitchen every year, and the multiplicity of conveniences which electricity brings about. The bother of carrying wood and coal, tending a furnace, disposing of ashes or cleaning a gas range are entirely eliminated in an electrically equipped home. The saving in food values is an item to which no dollars and cents value can be readily assigned. The additional time which a housewife has placed at her disposal when a home is equipped with an electric range is a saving which does not appear in the above figures. Innumerable other arguments can be offered in further support of the contention that electricity is highly economical. With actual cost figures such as those above, a belief in the various appliances based on actual experience, and the strong sales argument which the electrical idea lends itself to, men of the electrical industry will find the task of electrifying every modern home less difficult.

COST OF OPERATING AN ELECTRIC HOME OVER A THREE YEAR PERIOD*

Month	1920-21 Range, 2—600 watt Air Heaters, Lights and Appliances	1920-21 Water Heater	1921-22 Range, 2—600 watt Air Heaters, Lights and Appliances	1921-22 Range, 8,200 watts in Air Heaters, Lights and Appliances	1921-22 Water Heater	1922-23 Range, 8,200 watts in Air Heaters, Lights and Appliances	1922-23 Water Heater
March	$5.37	$3.85	$6.21	.....	$4.36	$ 9.64	$4.45
April	4.71	3.70	5.37	.....	4.25	9.15	4.26
May	4.21	3.79	5.71	.....	4.03	7.66	4.20
June	4.05	3.75	7.89	.....	4.10	8.58	4.25
July	7.38	4.56	7.95	.....	3.49	7.43	4.16
August	6.37	4.80	4.40	.....	3.96	6.03	4.14
September	6.08	4.07	5.30	.....	3.90	6.85	3.87
October	7.18	4.55	6.11	.....	3.17	8.28	3.76
November	7.46	4.32	6.29	.....	4.12	12.58	4.05
December	8.20	4.61	†	$10.97	4.03	14.98	4.04
January	7.55	4.29	†	13.96	4.25	15.57	4.19
February	5.75	4.23	†	14.49	4.19	10.45	4.28
Average	$6.18	$4.21	$6.13	$13.14	$3.99	$9.77	$4.14

*These figures include a surcharge of 6 per cent.

†Seven additional kilowatts in air heaters were installed December, 1921.

A Service for the Electrical Contractor

An Announcement

ONE of the notable weaknesses of the electrical construction industry in the West is that there is no clearing house in existence whereby a contractor can learn from the printed word what his fellow craftsman is doing. Each individual has been largely limited to his own circle of personal acquaintances in the discussion of the best and latest methods of electrical construction and the constant changes in practice in this growing industry. Other branches of the electrical industry have long profited by the publication of ideas, whereby the best thought of groups is brought together in a discussion of common problems.

E. EARL BROWNE

President of the California State Association of Electrical Contractors and Dealers and author of the series of articles on Electrical Construction beginning on the following pages.

Recognizing the need for a common forum for the interchange of ideas in the electrical contracting field, the Journal of Electricity and Western Industry is publishing a series of articles by a recognized authority on electrical construction, the first of which appears in this issue.

Mr. E. Earl Browne, president of the California State Association of Electrical Contractors and Dealers, needs no introduction to members of the contracting industry in the West. Mr. Browne has been identified with the electrical construction industry for the past fifteen years. He has been active in educational and organization work, and is a member of the successful firm of Browne-Langlais Electrical Construction Company, of San Francisco, being widely recognized as one of the most progressive and well informed men of the industry.

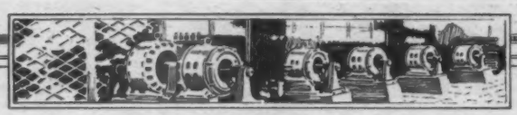
It is the object of this series of articles to discuss in a practical manner the many problems which daily confront the man engaged in electrical construction. The articles will be non-academic. Every attempt will be made to present the facts in a practical and readily understandable form. To this end, wherever possible, drawings, sketches and pictures will be liberally used to supplement the text. Mr. Browne will discuss the current practice of electrical installation in compliance with the latest code provisions for all classes of electrical construction. This will include the wiring of residences, flats, apartments, garages, machine shops, industrial plants, oil stations and the like. Other articles in preparation will discuss such subjects as grounding, motor control, flexibility of installation to care for changes and additions, estimating and job organization.

The cooperation of the electrical contracting fraternity among our readers is invited. It is the earnest desire of both Mr. Browne and the Editors to make this series of practical, dollars-and-cents value to the electrical contractor. In order that this may best be accomplished, criticisms and suggestions will be welcomed.

The intelligent contractor realizes that he is best serving himself by doing quality work—for which he should receive a fair profit. No man will knowingly commit business practices which result in actual loss to him. Ignorance of the best methods is a poor excuse, yet to ignorance alone may be attributed many of the losses which occur daily in the contracting field. An opportunity to keep abreast of the times is now offered through the medium of the printed word.

It is the expectation of the author that the series of articles on electrical construction will furnish a ready reference book for the intelligent contractor that he may employ the most economical and best accepted methods. The series should, by offering working drawings and practical discussions, be of great interest to journeymen, thus reducing to a minimum the amount of supervision required from the employing contractor. It is hoped that by presenting the actual details of construction work, as well as hints as to how business may be better conducted, the contractor will be able to show the legitimate profit on his books to which quality work is entitled.

ELECTRICAL CONSTRUCTION



By E. Earl Browne

RESIDENCE construction forms almost sixty per cent of the building activity of the country today, and upon the proper wiring of the residence depends the prosperity of the electrical industry of the future. The residence installation is the simplest of any electrical installation and for that reason this class of work is subject to keen competition. The results of this competition are too familiar to warrant much discussion. It is sufficient to say that the average residence installation is not indicative of progress nor does it reflect credit upon the electrical industry. In many instances the more intelligent contractors have abandoned the residence wiring field to curbstoners. As a result, the householder does not receive the full measure of convenience in his electrical installation which he desires, but which he, being unfamiliar with the progress of the art, is unable to anticipate.

It is the object of this and succeeding articles to discuss phases of the electrical installation in the better equipped home—the home so equipped that the householder gets full value for the money spent upon his electrical work.

Installing the Service and Distribution Board

The first portion of the work to be considered by the contractor is the service and distribution board. It is important that this be located in a readily accessible place so that meter reading and testing will not disturb the occupants of the house. The service and distribution board should be so constructed that future additions to the load may be installed without entirely tearing down the work already done.

The service wires should be No. 2 B. & S. R. C. (assuming a 3-wire, single-phase, 220-110-volt distribution) for a house of six rooms or less, in order to provide for the following loads:

Range and water heater with double throw switch	8.0 kw.
Air heaters (7 off)	17.0 "
Ceiling, bracket and convenience outlets, etc.	3.0 "
Total	28 kw.

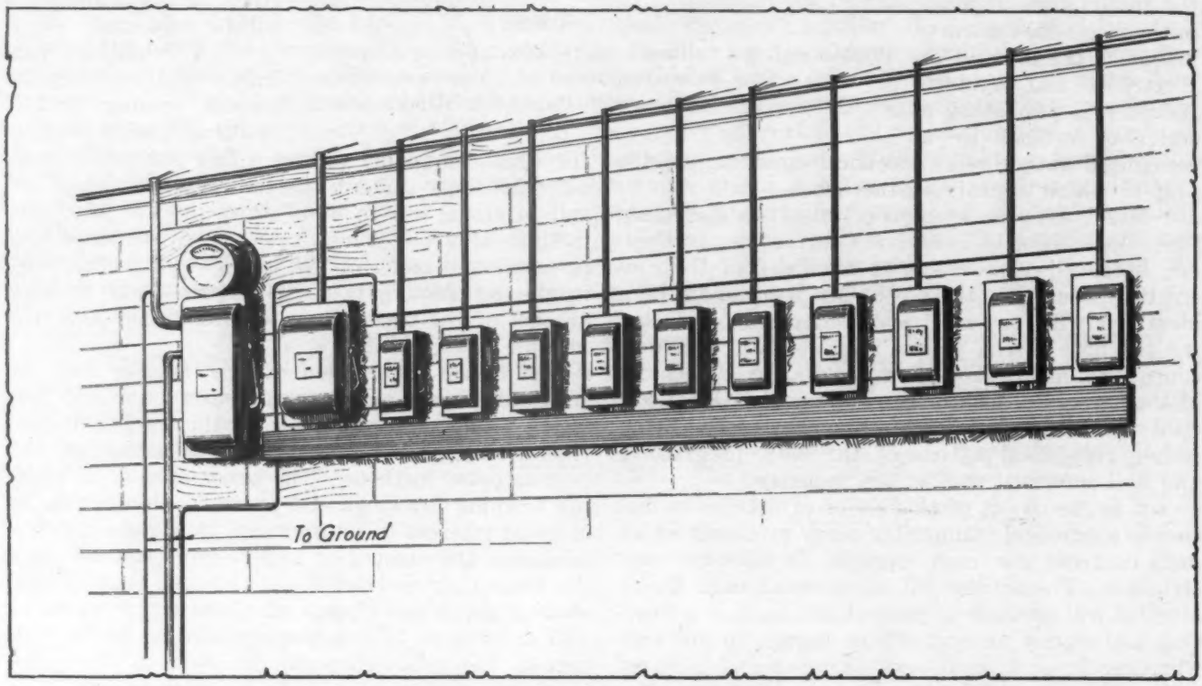


Fig. 2—Sketch of an all conduit service and distribution board installation for a residence equipped with electric range and water and air heaters.

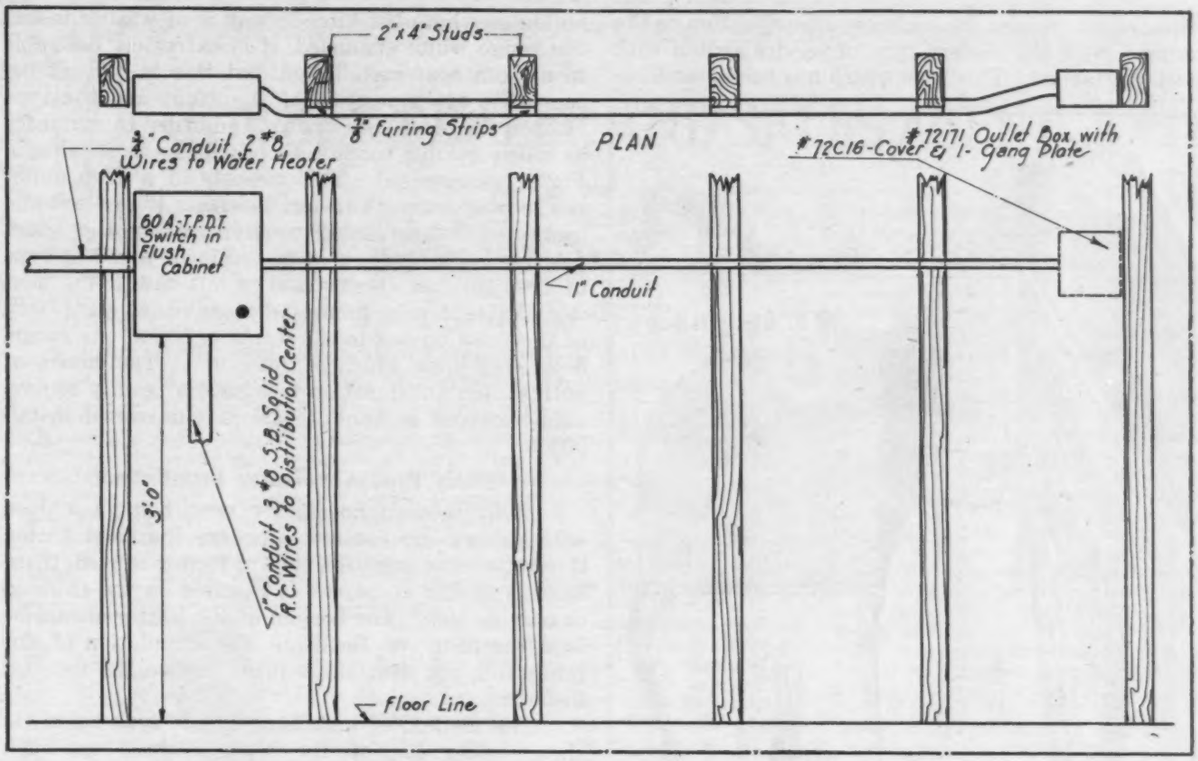


Fig. 3—Construction detail of range and water heater flush switch with junction box.

It is essential that ample service wire capacity be provided even though the initial installation may only include lighting and convenience outlets. With a diversity factor of 70 per cent the above load would make a total of 90 amp. and since No. 2 wire is rated in Table A of the National Electric Code at 90 amp., it would come within the provisions of the code. (The diversity factor of any system, or part of a system, is the ratio of the sum of the maximum power demands of the subdivisions of the system, or part of a system, to the maximum demands of the whole system, or part of the system under consideration, measured at the point of supply.)

The service switch should be 100 amp., 250 volts with solid neutral. The present practice of most power companies is to measure all current through one meter, and to have a sliding scale of rates and a monthly minimum ready-to-serve charge per kilowatt of connected load.

The ideal service, meter and distribution board would therefore be of about the dimensions and arrangement as Fig. 1.

Note in the accompanying diagrams (Figs. 1 and 2) that the busbar trough is set below the circuit switches. This arrangement enables the owner to change a switch at any time or make repairs without disturbing the entire installation which would be necessary were the switches connected with conduit nipples and splices made in each individual switch.

Figs. 1 and 2 show an ideal all-conduit installa-

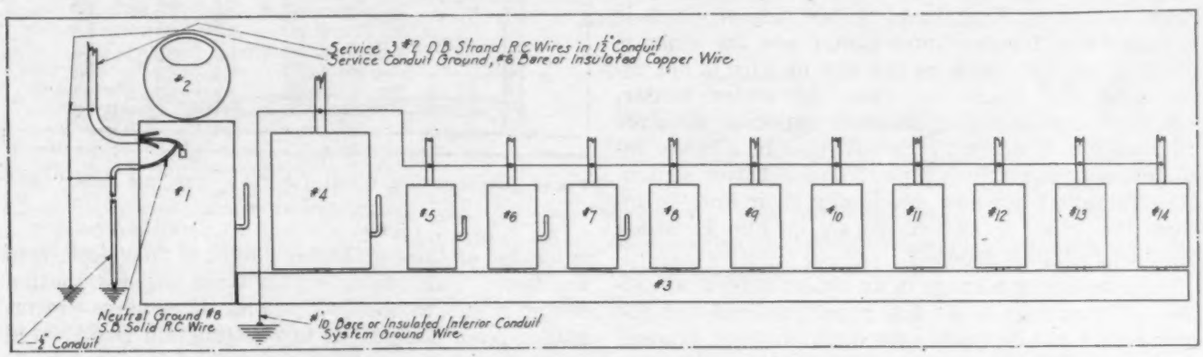


Fig. 1—Construction arrangement of service and meter and distribution center. No. 1—Main service switch. No. 2—Power company's meter. No. 3—Metal busbar trough. No. 4—60-amp., 3-pole range and water heater circuit switch. Nos. 5 to 11, inc.—30-amp., 2-pole air heater circuit switch. No. 12—30-amp., 2-pole convenience outlet circuit switch. Nos. 13 and 14—30-amp., 2-pole lighting circuit switch.

tion with provision for complete electrification of the home. Note the modern type of service switch with meter attached. This type which has been standard-

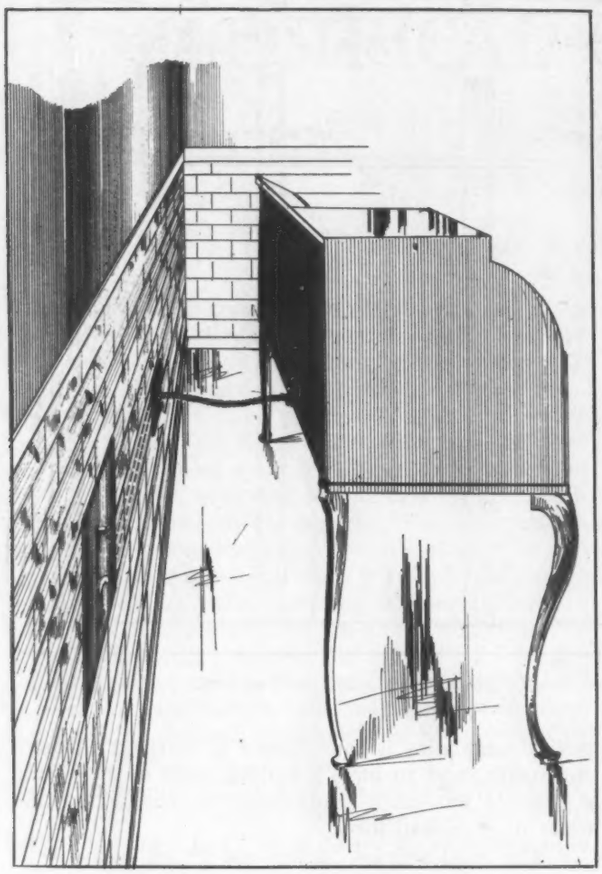


Fig. 4—Sketch showing arrangement of flush type double-throw range and water heater switch with range connected at junction box.

ized by several manufacturers has many features which make it the most desirable.

The Range Installation

The well equipped home will contain an electric range and water heater. The range and water heater should be placed on a double throw switch located near the range (Figs. 3 and 4), one side of which is usually fused for the water heater and the other is unfused for the range, as the size of wire is not reduced for the range, whereas the water heater, usually being of 5-kw., 220-volt capacity, requires but two No. 8 wires. It is desirable in a range installation to use a flush type of double throw switch. Manufacturers are now developing their lines to include the type of switch shown in Fig. 4, which should be 60-amp. capacity.

In installing a range in an old building the position of the range is usually predetermined and the installation can be made with a minimum of exposed flexible conduit direct from switch to range. In new buildings where the kitchen wall is of white tile and the range white enameled, it is extremely desirable to make a neat installation, but this is difficult because the exact position of the range and the type of oven is not usually known. In order to eliminate as much flexible conduit as possible, the scheme in Fig. 3 was devised. This consists of a flush outlet box located from six to ten feet from the switch and connected by concealed conduit. After the exact position of the range is determined, and the type of oven selected (right-hand or left-hand), the flexible conduit can be connected from either the switch or the junction box to the terminal box of the range, depending upon which is the closer. The covers of both switch and junction box have a readily removable knockout so that it makes a universal installation.

Flush Type Air Heater Installations

Many modern homes are now being equipped with electric air heaters. In case the combination convection and radiation type of heater is used, these heaters should be placed if possible on the exposed or outside wall. The bottom of the heater should be near the floor, to facilitate the circulation of air, preferably not over three inches above the finished floor line.

The method of installing a flush type heater is shown in Fig. 5. Note the two-pole, three-heat flush switch in standard, two-gang deep switch box which

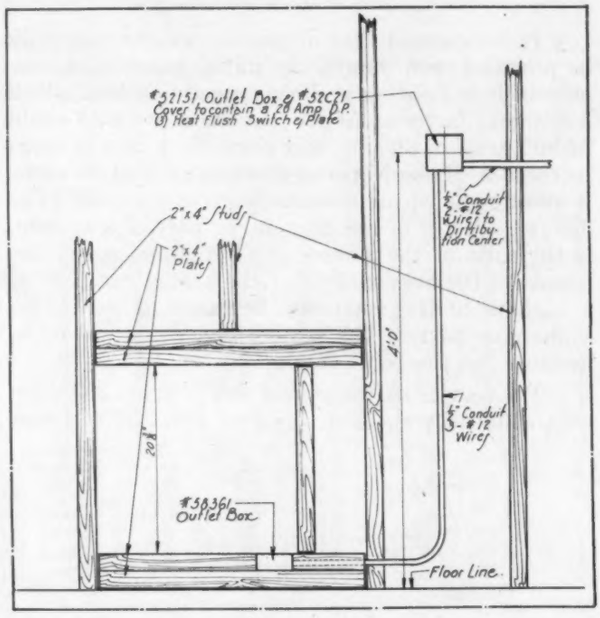


Fig. 5—Construction detail for flush type air heater and control switch.

is located at the convenient height of four feet from the floor. The heater circuit from the distribution center is run to the switch, and three wires are installed from the switch to the junction box located below the right-hand front corner of the heater.

JOBBER, DEALER AND SALES AGENT

Plans Perfected for "June Bride Week" Campaign

California Electrical Cooperative Campaign Will Aid in Directing June Buying Toward Electrical Merchandise

A concentrated effort to materially increase the sale of electrical household appliances by encouraging their use as wedding gifts will be undertaken by the California Electrical Cooperative Campaign during the week of June 4-9, 1923. Basing its efforts on the experience of last year when a similar campaign was staged with considerable success, plans have been outlined which are expected to benefit all branches of the electrical industry in the state. It is hoped that electrical merchandise to the value of approximately one million dollars will be moved from the dealers' shelves during the week of intensified sales activity.

Reproduction of the poster which will be distributed to all retailers.

Records for the state of California show that during 1922 there were 47,477 weddings, approximately one-sixth of which occurred during June. Under ordinary conditions there is a slowing up in the sale of electrical appliances during this month, which is popularly known in all lines of retail trade as "the summer slump." By means of the June Bride Week campaign the electrical industry expects to create a volume of business equal to that of the Christmas holidays.

During the week of June 4-9, every department of the electrical industry, including all retail agencies engaged in the distribution of electrical appliances, will cooperate in directing toward electrical merchandise the enormous purchasing power incident to June marriages.

The attention of the public will be directed toward electrical goods by means of window displays, newspaper advertising and publicity, slides in the theaters and radio broadcasted addresses. Material is being prepared for free distribution to all electrical retailers. This will include posters, slogans, theater slides and cuts for use in preparing newspaper advertising copy.

The poster will be the same as was used last year. It consists of a picture of a June bride printed in three colors on a sheet 16 by 23 in. A black and white reproduction of the poster, similar to the cut which will be used in all newspaper advertising copy, accompanies this article. The slogans, which will be printed in black and orange on a sheet 4¼ by 14 in., will bear such messages as "Combine Beauty and Comfort," "For Her Convenience," "For Modern Homes," "For Her Future Happiness," and "Gifts that Endure." The slide to be used in the theaters will be a reproduction of the poster in colors.

As an incentive to dealers to use the window display material in decorating their windows, prizes to the extent of $100 have been offered by the California Electrical Cooperative Campaign for the best window. The awards will consist of $25 for the best window, five prizes of $10 each for the next best windows and five prizes of $5 each for the next five. Photographs of all prize winning windows will be reproduced in the Journal of Electricity and Western Industry.

All orders for material must be in the hands of the Cooperative Campaign not later than May 7 so as to assure its prompt receipt by the retailer.

As an initial step in the June Bride Week campaign the following letter has been sent to the advertising managers of 97 California newspapers:

"You will be interested to know that a statewide sales campaign is to be inaugurated by the entire electrical industry during the week of June 4-9.

"To increase the sales-producing effect of the window display material which we are furnishing we are urging all local retailers of electrical appliances, and the power companies, to carry newspaper advertising; and as further encouragement toward this end we are offering to supply them free mat or stereo copies of the window-poster, in the form of a one-column, three-inch, black and white reproduction. This we are suggesting they embody in display ads as a means of tie-in between their newspaper copy and their window-trims.

"In addition to the power companies, everyone in your community who retails electrical appliances is included in this offer, and should be a good prospect for space in your columns, whether they be hardware merchants, druggists, furniture dealers, or strictly electrical retailers. We want to work with you in stimulating their appreciation of the benefits to be derived from a well-planned campaign of newspaper advertising. If you think of any further way in which we can be of assistance we would be pleased to have you suggest it.

"In a short time we will mail to you a series of articles which we hope you will be able to use, together with the advertising you procure, in the preparation of a special 'electrical section,' sometime during the 'June Bride' campaign."

Manufacturers and jobbers will cooperate in the campaign through their

What is the "June Bride" Campaign?

It is a concentrated effort by the entire electrical industry of California to materially increase the sale of electrical household appliances and devices by encouraging the practice of giving electrical wedding gifts.

DO YOU REALIZE THAT THERE WERE 47,477 WEDDINGS IN CALIFORNIA IN 1922?

This sticker explaining the campaign is being attached to all mail which goes to the industry.

Window display of the Newbery Electric Corporation of Los Angeles used during June Bride Week last year.

salesmen who will be used in spreading the message among the various dealers and retailers. The following letter has been sent to the sales managers of 66 manufacturers and jobbers in the state:

"We are determined that the 'June Bride' sales campaign shall go over bigger and better and be more far-reaching this year than last. But our determination will be like a gust of wind unless everyone in the electrical industry gets behind it and puts it over.

"You have seen a kid playing with a hoop—if he gives it a push it starts out with flying colors, soon it starts to waver, then to stagger about in circles and finally it dies in agonized convulsions. But if the kid keeps batting it along it maintains its even course and finally reaches the goal toward which it is directed.

"The same thing is absolutely true of a sales campaign. If it is to be left to pursue its own ungided way it had best never be launched. But if it is boosted, batted and urged along by everyone who is interested in its 'arriving,' then it is sure to steadily gain momentum and accomplish its purposes.

"We want this sales drive to go over in a big way. We are going to launch it and we are going to urge it along wherever it lies in our power to do so; but there are long gaps where we can't keep our hand on it and we want you and your organization to keep the 'hoop' on its way.

"June 4-9 has been selected for the period of concentrated effort. It is during this period that the special advertising features are planned for. All window display material will, however, be in the hands of the dealers by May 28, giving them a full week in which to get their windows and stores attractively arranged.

"There will be eleven prizes, aggregating $100, distributed among the retailers for the best trimmed windows.

"In about two weeks you will receive a copy of a circular letter which will give you in detail all of the plans for this sales drive, and from that you will undoubtedly learn of many ways in which you can tie in. In the meantime, HERE IS WHAT WE WISH YOU WOULD DO—First: Inform all of your sales staff of this drive, impress upon them the mighty important part that they as individuals play in its success or failure, and urge them to carry the message of the week and its possibilities to every dealer upon whom they call, stimulating him toward contesting for a prize. Second: Have your salesmen take the dealers' orders for the window display material, which will be composed of a 3-color poster and a set of sales-stimulating slogans. These orders are then to be mailed to us, no order being honored after May 7, and the material will be shipped free to the dealers. Third: Send us, at your earliest possible convenience, a list of your salesmen and the addresses to which we shall mail them copies of the folder describing the drive in detail. These will go forward immediately they are off the press.

"We must count on you for this information and assistance. Remember, every disinterested delay slows up the whole program."

The central stations of the state will tie in with the June Bride Week idea through their advertising. Stickers similar to that illustrated have been distributed for use on letters.

Suggestions for window displays by dealers can be taken from the accompanying photographs which show some of the windows employed last year for carrying the message of June Bride Week to the public.

Drink with Familiar Friends—Compare Bids with No One

By JOE OSIER

"Drink only with familiar friends and recite poetry only with a poet" reads an old proverb and—

Because the thing I am pleased to call my mind goes along with the mind of the man who coined the quoted phrase—

I shall warm up an idea I have on tap and send it out to battle in this column for a few fast rounds; to combat until given the gate or until I wind up the blurb amid a fanfare of trumpets and a tumpping of tom toms.

Here 'tis: Drink only with familiar friends and show your bid to no one—(with the possible exception of your partner)—

Lest you be gyped, flim-flammed and fozzled.

Some men of the Electrical Industry may take exception to my views on this subject, but that is their privilege. I must have views—or get back on the milk wagon—therefore,

I am of the opinion that a Man of the Trade who deliberately clambers to the housetops, waves his estimates on high and welcomes the world to lamp his bids is—

Inviting the "second low" and "too high" boys to collect his scalp; begging

them to snatch the lunch from his lips and—

Insisting that they grease the skids that lead downward and out.

Now I know of men in the game who are afraid to turn in a bid until they have questioned every other prospective bidder in the business. They want to compare estimates to see how they stand. They want to make absolutely sure that they are not too high nor too low and—

While they are finding out, they are tipping their mitts until a blind man could read their figures through—

Seven feet of sheet steel without goggles.

And, what does it get 'em?

And I answer: Nothing—including the loss of the job, because—

"Tigers and deer do not stroll together' 'and, by that I do not mean that Men of the Trade are either tigers or deer. As a rule, they are plain business men—seeing their duty and doing it—taking their discount when they can—redeeming their paper at the bank and—

Conducting their affairs in a business-like way and—

Business-like ways do not provide for showdowns until the estimates are tabulated and the results announced.

Sure, I realize that kind friends are better than unkind brothers, still—

I have known kind friends to wave a wicked weapon when a particular job was in danger of being lost.

Friendship, you know, does not necessarily call for coming clean when a plum is waiting to be plucked and a real friend will not jeopardize friendship by insisting upon a comparison of bids unless—

He is looking after the interests of some deaf, dumb and blind friend who, foolishly, is trying to make a name and a roll in a game that is meant for men only.

Now, I may be wrong. Still, in spite of the fact that I have been proven in error innumerable times, I have never admitted it and—

In this case, also, I am hanging "tuff" waiting for some one to show me that comparing bids gets any place except—

The short end of a long horn.

Now the opposition can have the floor.

Spring to't.

Use of Electricity Taught in California Schools

Industry in Los Angeles Tenders Electrically Cooked Banquet to 300 High School Domestic Science Teachers

Recognizing the fact that the pupil of today will be the homemaker of tomorrow, the electrical industry of Los Angeles, Calif., under the auspices of the California Electrical Cooperative campaign, recently served a dinner to a part of the public school staff there. The meal was entirely cooked by electricity in the auditorium of the Los Angeles Evening Express. The guests included the members of the Board of Education, the superintendent of schools, and a staff of 300 teachers representing the Home Economics and Domestic Science Departments.

The purpose of this dinner was to call the attention of the departments to the necessity of instructing the student of today in the proper use of electricity in the home. Particular attention was paid to cooking by electricity and lessening the drudgery in the home by the use of various electrical appliances.

The citizens of Los Angeles, at an election held in June, 1922, voted favorably for the adoption of a $17,500,000 bond issue to erect eighty new polytechnic, high and grammar schools and also for repairs and additions to some twenty-nine others. These schools are to contain the most modern equipment. Special attention has been given through the efforts of the electrical industry, to the proper wiring installation to meet not only the present but the future requirements. This will permit the fullest use of electricity in the domestic science departments, as it will operate various appliances, and in the future will heat these schools. It has been found in a number of instances, that in order to heat perhaps one room at night used by teaching staff members, it required the services of the janitor and the operation of the entire heating unit. This made it very costly, whereas the room or office could have been electrically heated for temporary use at a much lower cost.

It was partly because of this intention of the City of Los Angeles to build the new school buildings that the electrically cooked dinner was served to the members of the teaching profession in the city. The leaders in the electrical industry in Los Angeles were desirous of getting the electrical idea before the educators in the best possible way. It was determined that a dinner at which talks on correct electrical installations could be presented would aid in showing the teachers the advantages of electricity. The dinner, it was thought, would serve a double purpose for it would educate the teachers and would place them in a position to pass their knowledge to their pupils.

K. E. Van Kuran, Los Angeles district manager of the Westinghouse Electric & Manufacturing Company, as vice-chairman of the Advisory Board of the California Electrical Cooperative Campaign, presided at the dinner served to the members of the Board of Education and the staff of teachers. In his opening remarks, he explained that the purpose of serving this dinner cooked by electricity was to afford an opportunity of explaining the advance and development that California was making in the generation of hydroelectric power. Mr. Van Kuran told of the plans of the hydroelectric companies of California, which call for an expenditure of approximately $500,000,000 in the next decade in developing 6,000,000 hp. In addition to this he described the distributing and interconnected power systems of the West.

In his talk Mr. Van Kuran called the attention of the visitors to a booklet entitled, "A Glimpse of a Few Electrical Domestic Science Installations." This booklet was given to each guest as a souvenir of the occasion and presented illustrations of installations in various domestic science departments in California. Mr. Van Kuran urged the Board of Education to give serious consideration to specifications and proper installation of the wiring needed to meet the present and future demands of the department. He explained that when buildings are being erected is the proper time to make this installation rather than after they are completed.

E. F. Scattergood, chief electrical engineer of the Bureau of Power and Light, City of Los Angeles, expressed a willingness upon the part of the bureau to cooperate in every way with the school board and render every possible assistance in meeting their requirements. Robert L. Eltringham, manager of the California Electrical Cooperative Campaign, addressed the assembly on the subject "The Electrical Home of Today and Tomorrow," and urged the board to give serious consideration to the statements as outlined by Mr. Van Kuran, with reference to the installation of an adequate wiring system.

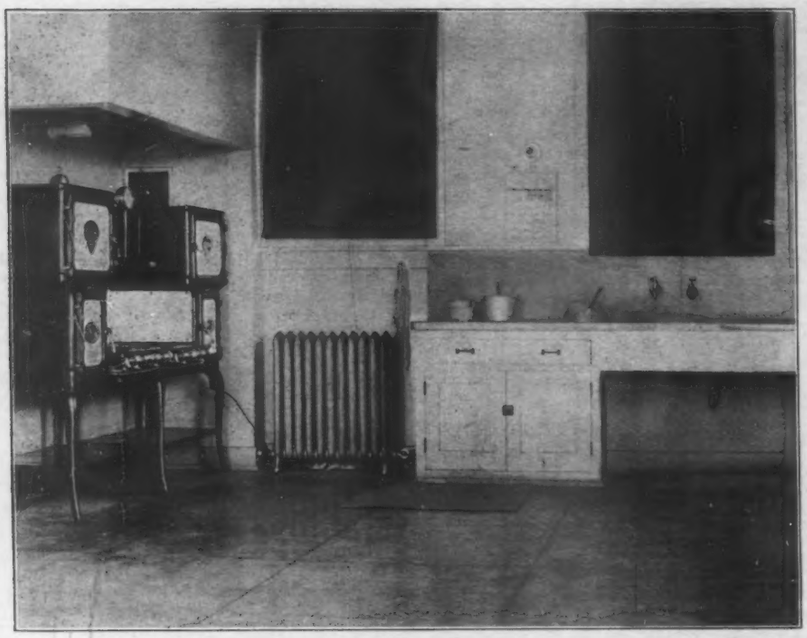
He explained that the servant in the home of today is a thing of the past and that the future requirements of the housewife will be such that it will be absolutely necessary, in order to lessen the burden of housekeeping, that the proper wiring installation be incorporated at the time of building. He stated that it was to the best interest of the housewife to have a number of convenience outlets installed in every room in order that she might be able to conveniently connect and use the many electrical devices designed to lessen her work.

In Mr. Van Kuran's opinion, the expression, "the woman's field is broadening," is heard everywhere today. He said that this is true in individual cases only in proportion to the degree in which the individual woman employs scientific time and labor-saving devices in the performance of her household tasks, thus conserving her time and strength for outside activities.

There is exactly the same routine of household duty in a home today as there was in those days when a woman was kept busy from sun-up until late in the night. The method of performing those duties is the only thing that has changed. Housekeeping today is what the woman makes it; it may be a pleasure or it may be a drudgery.

In planning to save her strength and her health, in planning to save time, whereby she might seek the pleasures which she most enjoys, the first place to receive a woman's attention should be her workshop. The woman's workshop is the kitchen for it is there that the greatest amount of time and energy is expended. Cooking in a kitchen which is dark and gloomy, faced by an array of pots and pans, with everything looking and feeling steamed and greasy, a woman loses more vitality than in any of her other household tasks. Anything that can be taught her to relieve this condition is a step in advancement.

Milton Henock, electrical range specialist of the Westinghouse Electric & Manufacturing Company, Miss B. E. Galvin, in charge of the home Economics Department of the Edison Electric Appliance Company, and R. E. Wyman, chief on the staff of the Los Angeles



In the Antelope Valley Union High School an electric range with two ovens and two broilers is installed in the girls' dormitory. The range aids in showing how electricity serves modern homes.

Times, each spoke of the advantages and economies of cooking by electricity and described the many sanitary advantages it possesses over any other fuel. They stated that there was no mystery or hazard in cooking by electricity and that it was no longer necessary for the housewife to cook in a heated kitchen. They noted the saving in the cost of utensils; the absense of all grease, soot and ashes. One of the speakers told of the lesser amount of shrinkage of meats and the more palatable condition of the foods cooked.

"Prudence Penny" of the Home Economics Department of the Los Angeles Examiner, in a short address, told the guests that the electric stove was not just a passing fancy, but that it was a device designed to lessen the work of cooking. She stated that hundreds of hotels and restaurants throughout the country are finding cooking with electricity to be the practical, economic way to most satisfactorily serve their patrons.

Miss Kate Drew Vaughn, who has charge of the Home Economics Department of the Los Angeles Evening Express, under whose direction the dinner was prepared, gave some very interesting details with reference to the preparation of the meal. She explained that so exact and steady is the temperature of an electric range that it has been possible to prepare charts known as "time and temperature charts" which give the exact time different food products require for cooking in ovens of a specific temperature.

Tables likewise have been prepared for the boiling of vegetables and the broiling of meats. When baking in an electric range, a woman can place her biscuits in an oven heated to a temperature of 500 deg. and without again looking at them, know that in 12 min. they will be thoroughly baked. Then she can go on with her housekeeping or go shopping, knowing that if she returns 50 min. later her bread will be baked perfectly.

Miss Vaughn told the guests that the electric range offers to the woman doing the cooking a maximum of all the qualities which she desires within her kitchen. The fact that there are no fumes arising from the burning fuel, no flames to endanger clothing or be extinguished by boiling liquids, makes the electric range healthful. The woman will enjoy the perfect control on the stove for she can start a meal and then leave it, while she attends to some other duty. It is conservatively estimated that there is a saving of from 10 to 20 per cent in the net weight of electrically cooked meats. To the careful housewife this means a great deal.

Miss Etta P. Flagg, supervisor of the Home Economics Department of the public schools of Los Angeles, said that a very convincing argument for the extensive use of electricity in the public schools was demonstrated through the fact that the students desire to use electric appliances. She stated that they preferred to use electrically heated cooking devices to any other type.

Mrs. Susan M. Dorsey, superintendent of schools of the City of Los Angeles, stated that the use of electricity for cooking in the home is a subject which should be given deep consideration by the educators of our growing children. It is her view that the extensive use of electricity as a fuel for cooking purposes will undoubtedly be in almost universal use by the time our younger generation assumes the duties of housekeeping. Mrs. Dorsey assured the members of the electrical industry that due consideration would be given to the suggestions as given in the various addresses of the evening.

The Los Angeles school department is regarded as one of the most progressive educational organizations in the entire United States. Its activities have been watched and followed by many others. The recognition by the school board of the advances that have been made by the electrical industry in making available electricity as the future servant in the American home, and its recognition of the desirability of teaching the "youth of the nation" to cook by electricity is a step in advance. The board's action will probably be followed by various school boards throughout the country where electricity is available.

Westinghouse ranges installed in the domestic science department of the Moor Park High School near Los Angeles. Thus the women of tomorrow are being taught the advantages of electricity in the home.

Reaching for the Appliance Customer's Pocket Book

Bisbee, Ariz., Dealer Mobilizes His Display of Christmas Gifts and Sells $600 Worth of Equipment in One Week

When Mahomet discovered that the mountain would not come to him no matter how hard he endeavored to draw it his way, he determined, as the story goes, to go to the mountain. In the present-day electrical business many men of the industry have claimed that business does not come to them in the way that they would have it. To these men the story of Mahomet has evidently not brought its message. They may have heard but in many cases they have not heeded the advice given by Mahomet when he started in quest of the mountain.

Purchasers of electrical appliances are not mountains, but in some cases it has been found that the electrical dealer has as much trouble drawing them to his store as Mahomet had in bringing the mountain to him. One of the main ways of creating the desire of ownership in the mind of a possible purchaser of any device, is to show it to him in a way that will not inconvenience him. To do this is often hard, for in spite of the fact that the show windows of the electrical dealer are his most valuable advertising mediums, he may find that many people in the city in which he is conducting his business do not pass in front of his store.

It was for this reason that Eugene Stevens, manager of the Stevens Electric Shop, of Bisbee, Ariz., decided to go to the housewife who could not get to his store. Mr. Stevens realized that there were many women who did not have the opportunity to come to his store and he decided that he would take samples of his stock of appliances to them.

In displaying the appliance stock to the residents of Bisbee, a city of about 9,000 people in the southern part of Arizona, Mr. Stevens made no effort to conduct a house-to-house canvass of the city. He was interested principally in displaying his goods and in that way attracting customers to his store where an adequate display of the appliances could be made. The purpose was to produce a portable show window which could be transported throughout the residential districts.

Mr. Stevens started his campaign of transporting displays of electrical equipment through the streets of Bisbee the week before Christmas last year. It was his contention that buyers of Christmas gifts could be reached in this way when other ways would be non-productive. Buyers were in the market for electric appliances for gifts and it was only necessary for the dealer to display the devices to them in order to attract their attention to this class of goods.

To carry his goods to the housewife in her home, Mr. Stevens rigged up an automobile delivery truck, upon which he arranged a display of electric appliances so that they could easily be seen from either side of the street. This truck was then driven around the city and the signs, painted and suspended from the running boards and elevated over the entire display, notified the women who saw the truck of the place where the appliances could be purchased in Bisbee.

The reports of the Stevens Electric Company for this one week just before Christmas, show that the portable display was a decided success. During the week $600 worth of appliances were sold in the city, and the company attributes much of this business to the interest that was created by the novel display.

To further increase the effectiveness of the traveling display truck, Mr. Stevens plans to install a small power plant so that electricity may be had for operating the appliances while they are on the truck. By this arrangement, it will be possible to conduct actual demonstrations of the appliances at any place where the truck may stop. In addition to this, it is also planned to install a show case on the truck and then drive the truck through the streets at night. The same generating set will provide electricity to operate electric lights which will be used to illuminate the case.

The Stevens Electric Company has found that this method of displaying electric appliances is so productive of sales that it will continue the practice and as has been stated, plans to make improvements upon the original display. The idea is one which can be utilized by any electrical contractor-dealer who is desirous of increasing his sales, but it cannot be considered to be the only selling activity that the dealer will have to use.

The Stevens Electric Shop of Bisbee, Ariz., used this truck as a moving display window during the week before Christmas and conducted a business in electrical appliances amounting to $600.

Astoria Dealer Opens Store 12 Hours After Big Fire

That fire, flood or famine are not sufficient to cause the electrical contractor-dealer to be downhearted was demonstrated in Astoria, Ore., after the fire that partially destroyed that city last December. The store and the stock of the McCartney Electric Company were both totally destroyed, yet the embers of the fire were hardly cold before the proprietor had a work bench and shelving up in the basement and was ready for business.

A view of the temporary showcases of the McCartney Electric Company on the sidewalk in front of the company's store, which was completely razed in the Astoria (Ore.) fire.

A long distance telephone call to the Fobes Supply Company in Portland resulted in the shipment by express of a quantity of necessary supplies, just twelve hours after the fire. This quick delivery placed the contractor-dealer in a position to be of real service to the community making temporary installations and connections in relief depots and other buildings.

Not to be outclassed by other stores of the city, the McCartney Electric Company put up a temporary showcase on the sidewalk for displaying such merchandise as was in stock. A large sized sign indicated that the company was far from out of business. In the accompanying photograph, the military looking figure with a gun was not hired for the purpose of guarding the McCartney stock, but was a national guardsman for the city was under temporary military rule.

INDUSTRIAL NEWS

Edison Company Will Add 30,000 Homes to Lines in 1923

Plans of the commercial department of the Southern California Edison Company, call for the connection of 30,000 new homes during this year which will use Edison service. This does not include the many thousands of new customers taking service from distributors who buy service from the company wholesale. On the customary ratio of five to one this means that 150,000 people will join the ranks of consumers in one year. This is greater than the population of many of the important cities of the country. It is interesting to note that every five minutes of the working day a new customer is added to the lines of the company. During the year the company plans to add 1,500 ranges and 500 water heaters, and to sign up a minimum of 100,000 hp. of new business.

Northwestern Electric Co. Lays Foundation for Plant

An item of construction of interest in the program of the expansion of the Northwestern Electric Company was the laying of an immense concrete slab weighing 1,259,550 lb., which served as the foundation for the giant turbines in the company's addition to its generating plant at the foot of Lincoln St., Portland. It took a crew of workmen, aided by ten auto trucks, more than 16 hours to pour the concrete. The slab is 4 ft. thick and approximately the size of one of Portland's down town quarter blocks. The work is being done by Parker & Banfield. The slab rests on a subfoundation of 300 piles, each of which is sunk 55 ft. into the earth.

The plant will be in operation late this autumn and will add more than 12,000 hp. to the company's generating capacity.

Long-Bell Lumber Co. Orders Equipment for Power Plant

The Long-Bell Lumber Company recently placed a large order with the General Electric Company for the equipment of the first unit of their power plant. The order includes steam turbo-generators, exciters and switchboard material and is one-half of the ultimate capacity for which the plant is designed. A more complete description of the items is as follows: 3—7,500-kva., 3,600-r.p.m., 2,300-volt Curtis turbo-generators, the turbines of which will be designed for condensing operation with steam at 225 lb. gage and 125° F. superheat; 1—200-kw. dual-drive exciter set, the generator being driven by both an induction motor and a small turbine; 2—350-kw. synchronous motor-generator sets with 275-volt d.c. generators. Battery charge sets, station service transformers, and a very complete switchboard equipment.

Shipment of all this equipment is promised before the end of 1923.

This installation will undoubtedly be the biggest of its kind in the Northwest. The contract for the erection of the power plant has been awarded to Charles C. Moore & Co. of San Francisco. Work will commence at once. The cost is unofficially estimated at $2,000,000.

Coos Bay Lumber Company Plans Improvements at Marshfield

Preliminary work on extensive improvements in the electrical side of the Coos Bay Lumber Company's plant at Marshfield, Ore., has been started and the completion will depend on the delivery of special equipment from the East. The improvements proposed for the year, which will probably be completed within three or four months, will mean an estimated outlay of about $250,000.

One of the first things will be the installation of a 6,000-kw. turbine, which will mean electrical production totaling 11,000 kw. maximum. It will also be necessary to increase the boiler plant whose present maximum is about 9,000 kw.

City of Seattle Plans Material Reductions in Rates

Reductions in city light rates in Seattle, ranging from six to ten per cent, are proposed in an ordinance introduced in the city council recently by the city utilities committee. The new rates for residence lighting are: First 40 kw-hr. per month, 5½c. per kw-hr.; the next 200 kw-hr. a month, 2c. per kw-hr. All in excess of 240 kw-hr. a month, 1c. per kw-hr. The present rates on this class of current are: 6 cents a kw-hr. for the first 45 kw-hr. and 2½c. for all in excess of 40 kw-hr. Rates for commercial lighting, which includes stores and offices, are cut an average of eight per cent below existing rates for this class of service.

No change is made in the rates for power current, except that a rate of $1.12 per calendar month per kilowatt, computed on the basis of the customer's maximum demand in kilowatts for such calendar month, is fixed for "dump power" defined under the ordinance as surplus hydroelectric current in excess of all other demands, and which therefore would go to waste.

The ordinance also abolishes the $1 charge now made for each new account.

Hood River Plant to Be Ready for Operation About May 15

The $1,250,000 hydroelectric plant of the Pacific Power & Light Company, now being brought to completion by the Phoenix Utility Company, will be formally dedicated about the middle of May, according to L. A. McArthur, vice-president and general manager. The big plant, including a 10-ft. pipe line a little less than 3 miles long and a concrete dam, will be tied in with the Northwestern Electric Company's plant at White Salmon, Washington, and the bulk of energy developed will be distributed in Portland. The dedication services will be attended by numerous Portland officials and men interested in electrical development from various parts of the Northwest.

Idaho Power Company Will Issue $3,200,000 in Bonds

Authorization of the issuance of $3,200,000 first mortgage 25-year gold bonds, the proceeds of which will be used to refund a like amount of outstanding notes, has been voted by the board of directors of the Idaho Power Company. The bonds, which will be secured by a first mortgage on the property holdings of the company, will mature Jan. 1, 1947.

A dividend of 1¾ per cent was declared on all outstanding preferred stock of the company, payable May 1.

The directors also authorized the payment of $3,299,000 of notes of the company, part by the bond issue and the remainder from other sources. The bonds were taken up by Harris, Forbes & Company of Boston and New York.

Industrial Heating School Will Be Held in Boston

A school in industrial heating for members of the sales departments of central stations will be conducted by the Industrial Heating Division of the Power Sales Bureau of the National Electric Light Association in Boston from May 14 to 26. The school will be similar to that held last year when 35 power sales engineers were given a thorough course in industrial heating. It has been estimated that the revenue from an average industrial heating installation is almost double that of an equal motor load and active steps are being taken by power companies for increasing this character of load. Already there have been twenty enrollments for this year's school. Central station executives who are planning to send men to the school are asked to communicate with V. M. F. Tallman, vice-chairman, Power Sales Bureau, N.E.L.A., Charles H. Tenney & Company, 200 Devonshire St., Boston, Mass.

Work Progressing Rapidly on Big Creek No. Three

Largest Hydroelectric Plant West of Niagara to Be Placed in Operation Oct 1 by Southern California Edison Co.

Construction is under way on the superstructure of the fourth power house on the Southern California Edison Company's Big Creek project, known as Big Creek plant No. 3, and the plant will be completed and in operation by Oct. 1 of this year. The first installation of three units in the plant will develop 100,000 kw., and its ultimate capacity will be double this amount. The power will be transmitted to Los Angeles, a distance of 240 miles over the first commercially operated 220,000-volt transmission line in the world. The completion of this plant will mark the consummation of the fourth step in the Edison Company's Big Creek project, which contemplates the development of 1,400,000 hp. during the next ten years from the water courses of the high Sierra in central California, at a cost of $375,000,000. During 1923 the company will spend $26,000,000, which includes besides the work on the Big Creek project, large expenditures for transmission lines, distribution lines, substations and other construction. Over 4,000 men are now engaged on the various phases of the Big Creek development, with a daily payroll of $35,000.

The initial installation in this new plant will consist of three 35,000-hp. vertical turbines built by the Wellman-Seaver-Morgan Company, operating at a speed of 423 r.p.m., and under a head of 760 ft. The generators are being furnished by the Westinghouse company. They will be rated at 25,000 kva., 11,000 volts, 50 cycles, and will have direct connected exciters. A novel feature of the plant will be the omission of a separate lubricating oil system. In this installation each bearing of the main units will have its own lubricating oil pump, thus eliminating all outside oil filters, pumps, supply tanks and piping, which are liable to cause trouble in operation.

The building will be 200 ft. long, 139 ft. wide, and 110 ft. high from the tailrace floor to the roof, and will be of reinforced concrete and structural steel. A feature of the building design is the elimination of the basement in the generator room. As the plant is laid out, the operating floor will be on two levels, one at the base of the generators, and the other at the elevation of the turbines, so that practically all of the equipment will be in view of the operator at all times. The switching station will be 195 ft. wide and 430 ft. long, and will consist of a series of concrete benches placed on the slope of the mountain, there being a difference in elevation of 46 ft. between the upper and lower benches. These benches will support the 220,000-volt transformers, oil switches, buses, etc.

The penstock for the turbines will be made entirely of lap welded pipe, varying in diameter from 7½ ft. to 6 ft. The valves at the bottom of these lines will be of the needle type manufactured by the Wellman-Seaver-Morgan Company. At the upper end of the penstocks butterfly valves 7½ ft. in diameter will be installed and arranged for control from the power house. At the upper end of the penstocks there will be installed a manifold of special design, which will connect the six penstocks of the ultimate installation with an 18-ft. steel pipe connecting to the tunnel. At this location there will also be installed a surge tank excavated from the solid rock. This surge tank will have a shape similar to an hour glass, the largest portion being about 75 ft. in diameter. This surge tank will relieve the penstocks and tunnel line from all possibility of damage due to variations of pressure in the pipe line.

The 21-ft. diameter tunnel leading from the intake at the diversion dam to the penstocks is 30,000 ft. in length. It has been excavated on a slope of three feet per thousand, and has a carrying capacity of 3,000 sec.-ft. The flow of water into the tunnel will be regulated by a 22-ft. diameter circular sluice gate, which was designed by the company's engineering department. The diversion dam is a simple arch type concrete structure. The maximum height of the dam from bedrock to crest is 134 ft. Four 7-ft. square sluice gates, having a combined discharge capacity of 3,000 sec.-ft., are installed in the dam. The dam and tunnel intake are located at the junction of Big Creek and the San Joaquin River, and the power house is approximately six miles downstream at the junction of Mill Creek and the San Joaquin River.

Actual construction work on the new plant will require only 141 days, and the first generating unit will be placed in operation about August 1, and will be followed by the second unit about Sept. 1, and it is expected that the entire plant will be completed and the power placed on the 220,000-volt transmission system by Oct. 1, of this year.

J. L. Stannard (left), chief engineer of the Cushman power project, Ralph Hillgrass, chief district forester, and Llewellyn Evans, superintendent of the Tacoma light department, on a snowshoe trip up the Skokomish River, inspecting the watershed of the proposed Lake Cushman power development which the city of Tacoma has under way. The trip was made primarily to obtain an idea of the run-off conditions of the basin, and found that because the mountains are so rugged, with such bare and steep sides, that when the snows melt, the water runs off rapidly without much loss into the ground. The engineers found 6 feet of snow at 2,000-ft. elevation.

Highway Lighting Installation Being Tried in Utah

The good roads committee of the Salt Lake City Chamber of Commerce, state, county and city officials, and many others interested in highway matters recently attended a demonstration of a new system of highway lighting on the Salt Lake-Ogden highway just north of Salt Lake City, Utah.

This experimental system, which consists of 15 General Electric Company highway units, of 250 cp. each, spread over a distance of about a mile, with a spacing of from 350 to 400 ft., was installed at the instance of the good roads committee of the Salt Lake City Chamber of Commerce, and the state highway commission. The particular site selected for the demonstration was chosen because it presents the three most difficult problems in highway illumination—a curve, a hill and a railroad crossing. The lights burned each night for a period of two weeks in order that the merits of the new system could be fully demonstrated. The experimental system was installed by engineers of the Utah Power & Light Company and the General Electric Company.

Alleys in the business section of Denver will be lighted for the first time as the result of a recent ordinance passed in that city providing for the installation of two 400-cp. lamps about 100 ft. from each of the abutting streets. Surveys have been completed by the Denver Gas & Electric Light Company and the installations will be made as soon as equipment is available. The improvement is intended to give additional protection to business houses against prowlers and to aid the policemen patrolling alleys at night.

City of Seattle Planning More Complete Street Lighting

Seattle's streets, already considered among the best-lighted in the world, are to be further illuminated, according to plans under way by Superintendent of Lighting J. D. Ross, who is chairman of the lighting and decorations committee of the general tourist committee of the Seattle Chamber of Commerce. Mr. Ross states that present plans provide for better lighting on the docks, and improved general lighting in the downtown section. A special flood lighting system for downtown buildings is being worked out, current for which will be furnished to building owners at very low rates. The city light department is considering the installation of flood lighting for some of the downtown canyon streets and colored lighting effects are also being considered. The plans are part of the general scheme for welcoming tourists this summer, and include electrically lighted welcome arches at the highway entrances to the city, flood lighting at the community house in the auto tourist camp, and special interior lighting for the community house.

Two San Francisco Jobbing Firms Effect Consolidation

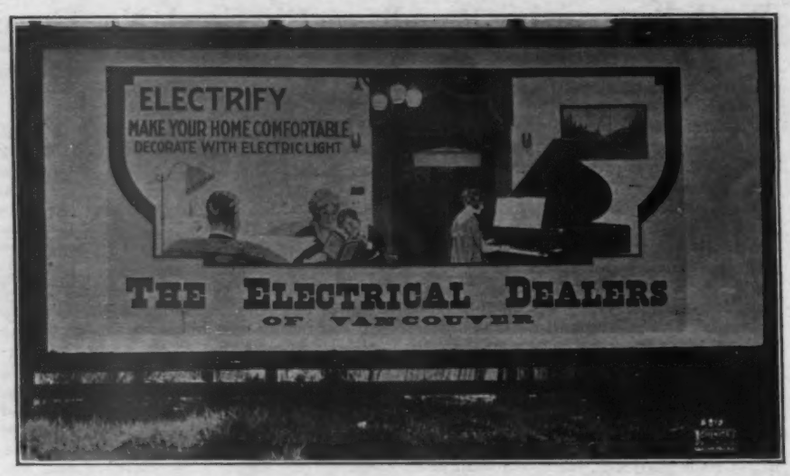
An important combination of jobbing interests in California occurred on May 1, 1923, with the consolidation of two San Francisco firms, the Electric Railway & Manufacturers' Supply Company and Fobes Supply Company, under the firm name of the Fobes Supply Company. The joining together of the personnel and merchandise stocks of these two houses has resulted in the formation of a new concern with a large organization and branches in San Francisco, Oakland, Portland and Seattle.

Of equal importance is the announcement that on May 1 the new concern will move into a spacious new building at 260 Fifth St. The building is planned and laid out with every thought centered on doing the job of wholesaling electrical goods most efficiently.

The officers of the new company will be F. N. Averill, president; R. J. Holterman, general manager; B. S. Manuel, sales manager; R. F. McDonald, assistant sales manager, and E. J. Duggan, purchasing agent.

The Electric Railway & Manufacturers' Supply Company was organized in 1898 by Samuel Taylor, now president of the Safety Manufacturing Company, and Allen Bowie, as a successor to the firm of Reger & Atwater Company. It was the pioneer electrical jobbing house of San Francisco. Mr. Taylor later acquired complete control of the firm and in May, 1920, sold his interests, remaining connected with the firm as president until March, 1922.

The Dixie Power Company of Salt Lake City, Utah, has applied to the Utah state engineer for permission to divert 30 sec.-ft. of water from the Santa Clara River, in Washington County, for the purpose of generating 800 hp. of electrical energy. The channel which will divert the water will be 30,450 ft. in length and a 5-ft. Pelton wheel will be used in generating the power.



One of the ten billboards advertising the electrical dealers, which are displayed by the central station in Vancouver, B. C.

B. C. Electric Co. Cooperates With Dealers in Advertising

Ten billboards designed to direct the attention of the public toward the electrical dealers in Vancouver, B. C., are being displayed in that city by the British Columbia Electric Railway Company, Ltd. The cost of this advertising is paid by the central station. The company has adopted this policy of advertising the dealers in order to inform the public that there are other electrical interests in the city aside from the central station. Although in the merchandising business itself, the company realizes that every appliance sold, whether by one of its offices or by a dealer, means additional load on its lines.

Northwestern Electric Co. Will Build Transmission Lines

The Northwestern Electric Company will start the immediate construction of a 66,000-volt high line into Vancouver from Camas, Wash., and will extend its 11,000-volt industrial lines into both the east and west side industrial districts of Portland, according to E. T. Merwin, vice-president and general manager of the company, who returned recently from conference with executives in San Francisco. Instructions to put augmented crews to work on the Vancouver high lines have been issued and the 18-mile gap between the main line at Camas and its Vancouver terminus will be rushed to early completion. At Vancouver the current will be stepped down to 11,000 and 2,400 volts for distribution among industrial plants in Vancouver. Construction of the Vancouver high line branch is part of the company's $500,000 expansion program planned for this summer.

The first issue of "Edison Partners," an eight-page illustrated quarterly pamphlet sent to stockholders, employees, and the general public, by the Southern California Edison Company has made its appearance. The purpose of the publication, according to President John B. Miller, is to acquaint those financially and otherwise interested in the welfare of the company with what it is doing to keep abreast of the rapidly increasing demands for electrical service in southern California.

Electric service will shortly be provided Gypsum, Colo., and adjacent territory by the Eagle River Electric Company, recently incorporated by Harrison L. Shaffer, B. L. Whitesell, and Otto A. Erdman, residents of that community.

Washington Legislature Passes Reed Power Sale Bill

With no arguments against the Reed bill passed by the last Washington Legislature, which gives municipalities permission to sell their surplus electric power outside the city limits, the bill, which carries the referendum clause, will go to the people of the state at the next election. This measure was the bone of contention throughout the legislature and was finally passed in amended form upon free conference report in the closing hours of the session. It gives municipalities the right to sell electrical energy generated from municipal plants outside the city limits and imposes a 5 per cent gross revenue tax upon gross receipts from sales both within and without the city limits. The tax does not apply to cities not generating their own current.

The board of water commissioners of Denver, Colo., has ordered three large De Laval pumping units to be installed as a part of the Denver water supply system. The order, which was placed with the Advance Machinery and Supply Company of Denver, calls for one 4,000,000-gal. electrically driven unit for the South University Park Station, one 8,000,000-gal. electrically driven unit for the Ashland Avenue Station and one 10,000,000-gal. steam turbine driven unit for the Park Hill Station.

Electrification of the Willapa Lumber Company's plant, located at Raymond, Wash., at a cost of $85,000, was decided upon by the board of directors at a recent meeting. In addition to the replacing of the present steam engines with motors, the plan calls for increasing the output of the plant.

Annual Electrical Convention Held in Salt Lake

Rocky Mountain Electrical Cooperative League Sponsors Meeting at Which Importance of Cooperation Is Emphasized

By M. L. CUMMINGS, JR.

The second annual convention of the electrical interests of Salt Lake City and adjacent territory was held on April 6 at the Hotel Utah, Salt Lake City, under the auspices of the Rocky Mountain Electrical Cooperative League. Approximately one hundred members, representing various branches of the industry, were in attendance.

The first session opened at 2 p.m., and was presided over by W. A. Moser, manager of the Salt Lake office of the Westinghouse company, and chairman of the Rocky Mountain Electrical Cooperative League.

In a brief address Mr. Moser introduced Sidney W. Bishop, executive manager of the Electrical Cooperative League of Denver, as the principal speaker.

Mr. Bishop chose as his subject "Putting Cooperation to Work," and covered many interesting phases of league and electrical matters. He pointed out how the electrical industry particularly is in need of team work in solving the many problems which it faces today—the team work of all its various branches. That the West can be given credit for the great development which has been made thus far in the industry, was his assertion.

He emphasized the necessity of educating the public to the many uses of electricity, and stated that the surface had barely been scratched in this work. "The big thought in getting the idea over to the public, of what we are trying to do, is one of education. Education is the breaking down of the barrier of resistance, and service is the giving of satisfaction after that barrier has been removed. There is where one of the greatest responsibilities of the electrical industry lies."

Mr. Bishop stated that the utilities, especially, throughout the country, are now following a program of building good-will through education, with the thought that this will, if successful, solve one of their big problems. He called attention to the work of the Joint Committee for Business Development, and outlined the plans under which it expects to accomplish very good results in building up the electrical industry.

In commenting on the uses of electricity in the home, Mr. Bishop stated that the electrical men are not getting the returns that they should from this source, and that the idea has not been sold sufficiently to the public. He pointed out the very small percentage represented by expenditure for electrical work in the average home, as compared with some of the other items of building cost. The opportunity for increasing the number of convenience outlets by systematic and intensive educational work was strongly emphasized by the speaker. Appliance sales could be greatly increased, he said, by cooperation, concentration, advertising, education and intensive selling.

Mr. Bishop referred to a study which had recently been made in San Francisco, resulting in establishing a figure of $20.60 as the average income to the electrical industry for each new outlet over a period of five years—illustrating the wonderful possibilities for increased revenue to the contractor, dealer and power company from such source.

The evening session, at 6:30 p.m., was largely attended, opening with a banquet. W. A. Moser introduced J. A. Kahn, president of the Capital Electric Company, as toastmaster.

Melvin H. Sowles, vice-president of Walker Brothers, bankers of Salt Lake City, was the principal speaker. Mr. Sowles spoke on the subject of general financial and business conditions, and outlined some of the features of the new Rural Credits Act recently enacted by Congress. He touched upon some of the underlying factors in connection with the present business conditions, and pointed out the necessity of aiding the farmer as one of the principal steps in the direction of the return to prosperity.

One of the features of the evening session was a lecture by E. A. Evans, of the Salt Lake City office of the Westinghouse company, and L. B. Johnson of the Salt Lake City office of the General Electric Company, on the subject of "Proper and Improper Store and Window Lighting."

View of the banquet held in conjunction with the second annual convention of electrical interests in the Intermountain Region at Salt Lake City.

By means of lantern slides showing charts and pictures, Mr. Evans showed vividly the contrast between good and poor window lighting, and pointed out the value of good lighting to the merchant as a business proposition. He gave a very interesting demonstration.

The entire program, both afternoon and evening, was exceedingly interesting and instructive. The get-together spirit was very much in evidence, and the discussions resulted in the exchange of many valuable ideas.

Colorado Tourist Camps Will Be Electrically Lighted

A movement is on foot in Colorado to make the tourist camp grounds of the state the lightest, brightest and most attractive spots in the United States. Instead of requiring visitors who arrive at night to grope their unfamiliar way about the grounds in search of wood, water and desirable places to set up camp, it is the plan to electrically light the whole camp-ground area.

Denver, which boasts one of the best lighted tourist camps in the nation, and Longmont, which is a close competitor for this honor, have been the inspiration for other towns who are striving to make their tourist camps so attractive that visitors will want to tarry. It has been determined that auto tourists remain from two to ten days longer in municipal camps that are well lighted, well watered and which have plentiful supplies of wood.

The Electrical Cooperative League of Denver is now taking a census of Colorado tourist camps, with a view to ascertaining how many of them are electrically lighted by the towns which support them.

There are 213 auto tourist camps in the state and the more progressive towns, where the value of tourist trade is appreciated, are making strenuous efforts to do everything possible to attract visitors. In Longmont a number of electric ranges have been installed. Dozens of desirable individual camping sites are illuminated with individual electric plants.

Ne Page-McKenny Co. Will Build Seattle Transmission Line

On a bid of $268,000, the Ne Page-McKenny Company, Armour Building, Seattle, received the contract for construction of the proposed transmission line from the Gorge Creek plant of the Skagit project to the North Substation at the Seattle city limits. The transmission line will be 100 miles long. It will be a 165,000-volt line, with a capacity of 112,000 hp. Contract for the line provides for completion within six months' time, the city furnishing most of the material involved, including wire, poles and cross-arms. The low bid was that of Grant, Smith & Company, Seattle, $424,100.

E. A. Thompson, local manager of the Fort Lupton (Colo.) Light & Power Company, believes that Johnstown, Colo., one of the communities served by his company, has established a record for the United States, if not for the world, in having every one of its 350 homes wired for electricity.

Technical Sales Problems to Be Handled by Engineer

The Capital Electric Company of Salt Lake City, Utah, has inaugurated a policy whereby their technical sales problems will be handled by a competent engineer. They have organized a Transmission and Street Lighting Department which is in a position to go into the engineering features of their customers' problems.

This department has been placed in charge of K. V. Laird. Mr. Laird is an experienced electrical engineer and a graduate of the University of California. He was formerly employed by the Anaconda Copper Mining Company, of Montana, and was also associated with the Gellert Engineering Company of Philadelphia, Pa.

Denver Man Urges Importance of Public Utility Advertising

George E. Lewis, executive manager, Rocky Mountain Committee on Public Utility Information, with offives in Denver, was one of the speakers at the Middle-West Division of the National Electric Light Association during its first annual convention in St. Louis, April 10-11-12. Mr. Lewis also spoke before a meeting of the directors of a dozen committees on public utility information.

"Selling the Public Utilities to Their Customers" was the subject of a talk given by Mr. Lewis before both bodies. As director of the Rocky Mountain Committee on Public Utility Information, Mr. Lewis for more than a year has been specializing in public utility good-will advertising. This committee has been instrumental in converting dozens of electric and other public service companies in its territory to advertising as a means of winning public confidence and establishing a friendly understanding with customers.

Mr. Lewis told the convention delegates that where but one public service company advertised for good-will in his territory one year ago, there are now two-score organizations regularly prosecuting this form of newspaper advertising. During the course of his address Mr. Lewis said:

"It is no longer a question of advertising for advertising's sake; competition is responsible for the large amount of advertising that the public utility companies are doing in the Rocky Mountain region. The competition I refer to is that of the demagogue, the misinformed, the antagonistic. These have out-advertised the public utility industry in the past. By word of mouth, chiefly, they have broadcasted their distorted, erroneous and unfair views to such an extent that they have succeeded in selling their ideas to a large part of the public, including the customers of the public utility companies.

"Every day the public utility, whether it realizes it or not, is in direct competition with the thriving industry of condemnation—condemnation of service, rates and the general deportment of the public utility. The other businesses combat their competitors with every available means at their command—publicity, advertising, better service and other established methods—the public utility business, since its inception, has been notoriously lax in competing with rivals far more dangerous and unfair than those with which the ordinary business must contend.

"Today the public utility industry, with nothing to hide and with every qualification that comes within the realm of the high standards established by the Associated Advertising Clubs of the World, which are the outposts and sentries for honest advertising, must outdo those who are against it. The utility industry must not only outdo existing competitors, but must overcome the lead obtained in the past by its enemies who were advertising while the utility business slumbered or carelessly ignored impending dangers."

Books and Bulletins

INTERIOR WIRING

By ARTHUR L. COOK, Department of Industrial Electrical Engineering, Pratt Institute. Second edition. 458 pages. 4¼ by 7¼ in. 250 illustrations. Flexible binding. $3. Published by John Wiley & Sons, Inc., New York.

This book constitutes a guide to modern practice in electric lighting and power applications, and in the design and application of wiring for such purposes. In the revised edition the author has incorporated the latest changes in the National Electrical Code rules, the most important of which are in the overload protection of motors, approval of the use of varnished cloth insulation on wires and of renewable fuses and changes in the requirements for grounding circuits. Another valuable feature of the book is the method laid down for determining the size and arrangement of lighting units and for estimating the size of motors required for various classes of service. The range of material covers the needs of the practical electrician, the style is clear and the illustrations are particularly good.

RATE-MAKING FOR PUBLIC UTILITIES

By LAMAR LYNDON. 209 pages. 5½ by 8 in. $2. Published by the McGraw-Hill Book Company, Inc., New York.

The subject of a fair and proper charge for the services of a public utility is one that is of unusual interest at this time. A book, therefore, which will assist in the understanding of the factors which make up a rate should be welcomed. The wide experience of the author in valuation of properties and rate-making together with the study of numerous authorities, decisions, and works on the subject have been combined in the text and the conclusions are set forth in a very clear manner. It is the intent of the book to point out the logical and exact conclusions for each factor which enters into the consideration of valuation and rate-making. As stated by the author: "The reasons for them are set forth in detail and any engineer or properly qualified investigator can choose between acceptance of these findings or offer better reasons for rejecting them."

The subjects covered by the thirteen chapters cover the general theory of rate-making, depreciation, to which 43 pages are devoted, methods of valuation, the rate of return, operating costs and rate-making for gas supply, electric supply, electric railways and telephone service.

In a number of places throughout the book certain court and regulatory commission decisions have been cited, but this procedure is not carried to a point which would prevent the reaching of definite conclusions by the reader.

The chapter on depreciation and the four chapters on rate-making are quite thorough, as the author works out mathematically a number of concrete problems and goes into detail to show the methods used to obtain certain values.

As an appendix a few pages are devoted to regulations promulgated by the Public Service Commission of Massachusetts for earnings of one of the utilities of Boston.

The work should prove valuable as a text book covering the elements of rate-making and as a means of reference for practicing engineers.

E. R. S.

EMF ELECTRICAL YEAR BOOK FOR 1923 IS PUBLISHED

The second annual edition of the "EMF Electrical Year Book" has been issued by the Electrical Trade Publishing Co., Chicago, Ill. This is a combined dictionary, encyclopedia and trade directory of the electrical industry. Of its original 14,000 or so topics nearly half have been entirely rewritten or completely revised. Several thousand new topics have been added. The definitions cover all electrical terms of both theoretical and practical interest. Among encyclopedia topics are facts and useful data on each branch of the industry; topics dealing with the chief lines of development and of equipment; nearly 100 biographies of electrical men; lists with data of electrical associations, colleges, periodicals, libraries, and laboratories. Included in the trade directory feature are some 3,150 classes of electrical products, each with lists of its manufacturers; there are also separate entries under the names of each of the manufacturers and their trade names. A staff of 36 contributors aided in compiling the technical topics of the new book. There are hundreds of topics dealing with hydroelectric and steam-electric plants, transmission and distribution lines, and other matters of interest to electrical engineers and executives connected with power companies. The new book is a large volume (9 by 12 in.), of 1,030 pages of text and over 200 pages of advertising. It is attractively bound and its subscription price is $10.

Benn Brothers, Ltd., 8 Bouverie St., London, have recently published the Electrical Trades Handbook and Directory for 1923. The book contains lists of British power projects, both developed and projected, British, Colonial and Continental power companies, British and foreign electrical railways, electrical manufacturers and engineers. The price of the book is 10 shillings, net.

Meetings

Salt Lake City Engineers Hold Interesting Weekly Meetings

At the regular weekly All-Engineers' luncheon, held at the Salt Lake City Chamber of Commerce on April 9, Miss Clotilde Grunsky and C. E. Grunsky were guests of honor.

Mr. Grunsky, in a short talk, conveyed the greetings of the civil engineers of San Francisco to the members of the engineering profession in Salt Lake City. He outlined briefly some of the recent activities, and some of the proposed future activities of the American Society of Civil Engineers, and stated that it was his intention to recommend Salt Lake City as the place for the 1924 convention of the irrigation division of the society.

R. A. Hart, senior drainage engineer of the U. S. Department of Agriculture for this district, was the speaker of the day. Mr. Hart, who has recently returned from a trip to Hawaii, where he went for the purpose of investigating drainage conditions, spoke very interestingly on the subject of "Some Aspects of Engineering in Hawaii."

H. E. Clement, mining engineer, of Salt Lake City, presided at the luncheon, which was attended by more than fifty members of the various branches of the engineering profession.

These weekly luncheons, held every Monday, and known as the All-Engineers' luncheons and meetings, are well attended, and provide a very satisfactory method of getting together for the engineering fraternity of the city.

Electric Heating Is Discussed Before San Francisco League

Every phase of electric heat was presented to members of the San Francisco Electrical Development League at a recent meeting when eight experts on the subject addressed the league members. The meeting was one of the most noteworthy in the history of the organization from an educational standpoint. W. Wesley Hicks acted as chairman of the day.

The first speaker on the program was U. G. Brown, construction engineer of the Matson Navigation Company, who read a paper on "Oil versus Electricity in the Matson Building." Mr. Brown pointed out that oil was finally chosen as the fuel for heating the new Matson Building after careful tests had been made with electricity, which showed that heating the structure by electricity would cost approximately $3,000 per year more than oil at the prevailing power company rates.

E. Earle Browne, of Browne-Langlais Company, discussed electric heating from the standpoint of the electrical contractor and pointed out some of the construction features necessary for a proper electric heating installation.

A. Strauch, electric heating specialist, traced the history of electric heating and cited a case in 1906 where many homes in one community were completely equipped for heating, cooking and lighting.

That the time will come when it will be possible for the majority of homes to be electrically heated throughout was the prophecy of A. J. Kercher, consulting engineer. He explained the steps which must necessarily be taken before this prophecy can become a reality.

The attitude of the fire underwriters toward electric heating was presented by R. J. Larabee, district engineer for the Underwriters' Laboratories. He discussed the fire losses attributable to electricity and pointed out how these are diminishing.

A. J. Moyle of the Chester N. Weaver Company, automobile dealers, told of the experience his company has had with electric heating. The firm's shops, offices and salesrooms are heated by electricity and this type of heating has proven entirely satisfactory, according to Mr. Moyle.

Frank Woodward, general sales manager of the Great Western Power Company, explained the power company attitude toward the heating load and cited some of the experiences his company has had with apartment houses which are heated with electricity. The characteristics of an electric heating load were discussed by Don Ray, assistant manager, commercial department, Pacific Gas & Electric Company. Mr. Ray compared the revenue derived from heating loads with those from other characters of service, indicating that this type of load was particularly desirable.

COMING EVENTS

Southwestern Public Service Association—
Annual Convention—Fort Worth, Tex.
May 15-17, 1923

National Electric Light Association—
Annual Convention—New York, N. Y.
June 4-8, 1923

Pacific Coast Electrical Association—
Annual Convention—San Francisco, Calif.
June 19-22, 1923

Northwest Electric Light and Power Association
Annual Convention—Seattle, Wash.
June 27-30, 1923

Rocky Mountain Division, N.E.L.A.—
Annual Convention—Glenwood Springs, Colo.
Sept. 17-19, 1923

American Institute of Electrical Engineers—
Pacific Coast Convention—Del Monte, Calif.
Oct. 2-5, 1923

Electric Club Is Organized at Wenatchee, Wash.

Power company representatives and electrical men of Wenatchee, Wash., met at an informal dinner on March 22, for the purpose of organizing a local electric club. The organization effected meets a long-felt want for a body through which electrical interests and the power company may cooperate to give better service in the community. Ray U. Muffley, manager of the Washington Coast Utilities, was elected temporary chairman. The following officers were elected: president, Lewis Shreve; vice-president, V. R. Wright; secretary, W. A. Buttles; and treasurer, H. L. Clark.

Denver League Entertains Real Estate Exchange at Meeting

A double-header event in the form of a "telephone party" and an "electrical day" with the Denver Real Estate Exchange was featured by the Electrical Cooperative League in the Mile High City, April 17-18.

Celebrating the activity of the Mountain States Telephone & Telegraph Company as members of the organization, the league featured its regular quarterly dinner-meeting with entertainment and a switchboard demonstration provided entirely by employees of the telephone company under the direction of Dean D. Clark, Denver commercial manager and member of the league advisory board.

John F. Greenawalt, director of publicity for the company and one of the veteran "good-will" builders of the mountain region, said that he was asked to perform as the principal speaker of the evening and the talk which was given, according to reports from Denver, proved a masterpiece in favor of good citizenship and service by all branches of the electrical industry.

An educational moving picture entitled "Behind Your Telephone," which was produced in Denver, was shown for the first time to the industry.

John J. Cooper, chairman of the league, presided at the Realtors' meeting on April 18 at the Denver Civic and Commercial Association with which was combined the regular weekly advisory board meeting of the league. Following the practice established last year, the meeting was devoted to the exposition and discussion of electrical subjects most likely to be of interest to those real estate men engaged in building activities.

Mr. Cooper reviewed the developments and progress of electricity and its application to the point where the educational program of the industry as a whole might be explained by S. W. Bishop, executive manager of the league. The latter presented the problems in relationship to the conditions found in Denver and the effort which is being made through cooperative effort to provide a solution and thus better serve the public.

F. J. McEniry, league field representative, and well known among Denver realtors, and George W. Bixler, director of publicity for the Denver Gas & Electric Light Company, also gave short talks.

M. Elliott Houston, president of the real estate bureau, had previously been an honor guest at one of the league luncheons at which time he expressed his appreciation for the development work done by the electrical organization and extended the official invitation to cooperate in the holding of a joint meeting. As a result of these personal relationships, an extremely helpful spirit has been developed, it is said.

Under an agreement reached between officials of the Douglas (Ore.) County Light & Power Company and The California Oregon Power Company, an immediate survey will be started by engineers of the latter company with a view of taking over the smaller utility at the end of a 60-day period.

Personals

A. B. West, vice-president and general manager of Southern Sierras Power Company and the Nevada-California Electric Company, has been named president of the Southern Sierras Power Company, to succeed the late

A. B. WEST

Guilford S. Wood of Denver. Mr. West was graduated with the class of 1899 from Stanford University, later taking a two-year post-graduate course in law. He became junior member of the law firm of Potter and West in Denver several years later. This firm was at that time acting as general counsel for the Nevada-California Power Company. When this company decided to enter the southern California field, Mr. West was transferred from the legal to the operating side of the business as vice-president and assistant to Delos A. Chappell, the president. He has been associated with the company during its remarkable growth and has had an active hand in developing the southernmost portion of California. He has taken an active interest in the affairs of the Pacific Coast Electrical Association, having served as president of the organization. Coincident with the announcement of Mr. West's election to the presidency of the company, came the announcement that **Fred O. Dolson**, general superintendent, and **E. B. Criddle**, general agent, had been appointed vice-presidents of the company.

Nathan Levinson, radio specialist, Pacific district, Western Electric Company, is in Los Angeles in the interest of his company. Mr. Levinson is particularly interested in the development of the Western Electric public address system and has installed this system at several large banquet halls for temporary meetings.

J. W. Mahoney, secretary of the San Francisco Electrical Development League, recently spent a few weeks in Los Angeles. Mr. Mahoney is chief of the order department of the General Electric Company's San Francisco office and went to Los Angeles to install a new system in that office of his company.

Norman Read, vice-president and general manager of the Colorado Power Company, and past chairman of the Denver section of the American Institute of Electrical Engineers, presented a highly interesting paper on the "Construction and Operation of a Transmission System" at a recent meeting of the Denver section of the Institute. The paper has been entered in the prize competition of the A.I.E.E. and is based upon Mr. Read's personal experience during the past ten years in connection with transmission lines in the Rocky Mountain district.

Howard S. Snell has been appointed chief engineer for the Montana Public Service Commission to fill the vacancy caused by the resignation of **James H. Bonner**. Mr. Snell comes to the Montana commission with twelve years' experience in public utility work. He was engineer for the public service commission of Kansas for three and one-half years and was consulting engineer for the Kansas City, Mexican & Orient Railway Company. He has had five years experience in valuation of utility properties.

Calvin Rice of New York City, secretary of the American Society of Mechanical Engineers, made a tour of the West addressing various engineering organizations before going to Los Angeles to participate in the regional meeting of the society to be held April 16-18, 1923.

Herbert Nunn, Oregon state highway engineer, has resigned to open offices as a consulting engineer in Portland. During his six years as highway engineer Mr. Nunn supervised the construction of 5,010 miles of public highway in Oregon.

Dr. Robert A. Millikan, chairman of the executive council of the California Institute of Technology and director of the Norman Bridge Laboratory, is in the East attending a number of scientific meetings. He has already addressed the American Institute of Electrical Engineers in New York and will speak at the annual meeting of the Carnegie Institute in Washington. While in Washington he will attend the meetings of the National Academy of Sciences, the National Physical Society and the National Research Council. It will be remembered that Dr. Millikan was recently awarded the Edison medal for distinguished electrical research.

J. C. Jones of the Los Angeles office of the Westinghouse Electric & Manufacturing Company, has been made manager of the central station division in that territory and will also have charge of the sale of supply apparatus for the company. Other changes in the personnel of that office include the appointment of **G. B. Kirker** as manager of the transportation division, which was formerly the railway division. **R. A. Hopkins** will have charge of the newly created engineering division.

B. E. Torpen has been appointed to the engineering staff of the City of Tacoma to fill the post of hydraulic engineer in connection with that city's Lake Cushman hydroelectric project. **H. A. Cole** and **J. G. Eernisse** will fill the posts of assistant mechanical engineer and assistant electrical engineer, respectively, while **Lloyd Joubert** has joined the staff as an engineer in the electrical department.

P. H. Affolter, of the Garland Affolter Company of San Francisco, was a recent Los Angeles visitor.

W. S. Hodgson, formerly assistant secretary and treasurer of the Utah Power & Light Company, has accepted a position with the Electric Bond & Share Company of New York. **R. H. Jones** succeeds Mr. Hodgson with the Utah company.

W. E. Creed, president of the Pacific Gas & Electric Company and also of the Columbia Steel Company, recently inspected that company's operations in Utah where steps are being taken for the establishment of a large steel producing center.

William H. Crawford, at present manager of the Department of Industries of the Portland (Ore.) Chamber of Commerce, has resigned to become affiliated with The California Oregon Power Company. He has been appointed to organize a new service in the company to be called the New Industries Department which will have for its purpose the encouragement of commercial development in the sections of Southern Oregon and Northern California served by the lines of the company. Before coming to the Pacific Coast in 1902, Mr. Crawford spent two years in the Orient with the general importing firm of Frazar & Company in Yokohama and several years in the Atlantic Coast selling railway appliances. For thirteen years he was with Charles C. Moore & Company, engineers of San Francisco, as sales engineer and manager of the Portland district office. During the next two years he was sales manager for the Simmen Automatic Railway Signal Company, of New York, traveling over the United States in the interests of railroad block signal applications. He then returned to Portland to take over the management of the Department of Industries of the Portland Chamber of Commerce which has received his entire time for the past six years. Mr. Crawford, in his new work will make an industrial survey of the territory served by The Californ-

WM. H. CRAWFORD

nia Oregon Power Company and will furnish accurate information and data on the economic possibilities of the field to concerns who might be interested or induced to establish industries here. The department will work in close harmony with the chambers of commerce in the territory.

W. C. Smith, transformer specialist for the Pacific Coast for the General Electric Company, delivered an illustrated lecture on the subject of "The Electric Transformer" before the April meeting of the San Francisco Section of the American Institute of Electrical Engineers. The same lecture was given before the Los Angeles Section of the Institute on March 27, 1923.

J. B. Barnhill of the firm of Evans & Barnhill, San Francisco, spoke before a recent meeting of the Oakland Electric Club on the subject of "Value of Advertising to Retail Trade."

George B. Cook, of the American Cross Arm & Conduit Company of New York, is in Los Angeles going over the business field in this section in the interests of his company.

Frank L. Ostler has been appointed secretary of the Public Utilities Commission of Utah, to succeed **T. E. Banning,** who resigned last February. Mr. Ostler has had considerable experience in rate work, having entered the rate department of the Oregon Short Line Railroad at Salt Lake City in 1907. Ten years later he was transferred to the accounting department of that railroad. In April, 1921, he accepted a position as deputy in the office of the state auditor of Utah, and was later placed in charge of auditing accounts in the various departments and state institutions.

Jacob A. Kahn, president of the Capital Electric Company, Salt Lake City jobbers, has been made president of the newly organized Utah Builders' Exchange, an organization formed for the promotion of the building industry in Utah. Mr. Kahn is one of the most active figures in the electrical industry in the Intermountain district. He took a prominent part in the organization of the Rocky Mountain Electrical Cooperative League and served as president of the advisory committee of that organization during 1921. He is also active in the affairs of the Pacific Coast Division of the National Electrical Sup-

J. A. KAHN

ply Jobbers' Association. Mr. Kahn became connected with the Capital Electric Company, one of the largest jobbing houses in the Intermountain district, in 1918 as vice-president and treasurer. Later he held the position of vice-president and general manager and more recently the office of president.

Durbin Van Law, well known electrical engineer of Denver, Colo., who is managing the mountain district of the United States Veterans Bureau, addressed the Real Estate Exchange in that city March 14.

W. B. Lewis, formerly in the sales department of the San Francisco office of the Western Electric Company, is now in the Los Angeles office of that organization. Mr. Lewis has had considerable electrical experience and formerly had charge of the San Joaquin territory.

F. R. Smith, formerly representative of the Wise-McClung Manufacturing Company in the mountain region, has assumed charge of the catalog department of the Hendrie & Bolthoff Manufacturing Company in Denver, Colo.

Frank A. Easton, formerly head of the gas department of the San Joaquin Light & Power Corporation at Bakersfield, has been transferred to the head offices of the company at Fresno where he will have charge of the sale of the company's securities as stock sales manager.

Warren Stoutnor, a member of the Public Utilities Commission of Utah, has been appointed by the president of the National Association of Railway and Utilities Commissioners as a member of the special committee on telephone depreciation which meets in Washington May 1. Insofar as Utah is concerned, the commission is enjoined by the Federal court from interfering with the rules and regulations as prescribed by the Interstate Commerce Commission, and this hearing which Commissioner Stoutnor will attend is to adopt new rules for accounting and depreciation.

F. F. Winfree, electrical engineer at the head offices of the Mountain States Power Company, has assumed control of the Eugene office. He takes the place temporarily of **Fred Brown,** who leaves for Tacoma, Wash. Mr. Winfree is in charge of the new business of the company in Albany. He will be stationed in Eugene only until a resident engineer can be employed to take charge of the company's properties in Lane County.

D. W. Davis, former governor of Idaho and now special assistant secretary of the interior, accompanied by **A. P. Davis,** director of the reclamation service, will enter the Pacific Northwest on a tour of investigation of reclamation projects at Klamath Falls, Ore., May 1. From there they will go to Portland, thence to Hermiston, Ore., to examine the Umatilla project. After inspection of the Columbia Basin irrigation project they will go to Boise, Idaho.

E. R. Crocker, for 15 years reclamation service engineer and for the last three years stationed at Hermiston project in west Umatilla county, has been selected to conduct the survey of the Umatilla rapids project, and will start preliminary work, planning to get into full swing during the low waters of summer. It is not known over what period of time the survey will extend, but the $50,000 appropriation by the government for the work is not expected to carry out the complete program.

G. C. LaMarsna of the Taft Electric Company, Taft, Calif., was a recent Los Angeles visitor.

N. Nanassy of Catton Neill & Company, Inc., Honolulu, recently visited Los Angeles.

August J. Lutz, Oakland district manager of the Pacific States Electric Company, has been elected president of the Oakland Electric Club for the coming year. Mr. Lutz entered the electrical industry at the age of 14 as errand boy at the California Electric Works, the fore-runner of the Western Electric Company in San Francisco. He held various positions with this company until in 1905 he was placed in charge of the billing department. He left this company to join the John M. Klein Company. After the San Francisco fire

A. J. LUTZ

in 1906 he took charge of the stock department of the Century Klein Electric Company, leaving in 1908 to become a salesman for the Sterling Electric Company, the predecessor of the Pacific States Electric Company. He remained on the road for the latter firm until September, 1922, when he was appointed district manager of the Oakland office. Mr. Lutz has been very active in the affairs of the Oakland Electric Club and the organization is looking forward to a promising year under his leadership.

J. Jerome Canavan, Pacific Coast distributor for Walker electric trucks, was the principal speaker at a recent weekly luncheon of the Seattle Electric Club, speaking on the subject of "Electric Trucks in Industry."

Obituary

Charles Preston Burgess, general manager of the Pacific Coast Steel Company and president of the Steel Mill Foundry & Supply Company, died in San Francisco on April 14, 1923. Mr. Burgess was well known as a leader in the iron and steel industry of the Pacific Coast. He was born in Birmingham, Ala., 48 years ago. He was formerly general superintendent of the western plants of the Republic Iron & Steel Company, with headquarters in Chicago. In 1914 he became general manager of the St. Louis Screw Company, remaining with that firm until 1916 when he joined the Pacific Coast Steel Company as manager of its Seattle office. He came to San Francisco as general manager of the company in 1919.

Manufacturer, Dealer and Jobber Activities

The Square D Company, Detroit, Mich., has recently perfected a new industrial safety switch, which is described in Bulletin No. 30. The new switch embodies several new and distinctive features including unit bases of moulded composition for each jaw and fuse clip instead of the old slate base. Porcelain protective covers enclose each line terminal so that even when the switch cover is open, no live parts are exposed. These protective covers can easily be attached or removed at will.

The Condit Electrical Manufacturing Company, South Boston, Mass., has just issued Bulletin No. 417-2 describing its protective relays and accesories for electrically operated switchgear. The bulletin describes the various types of relays manufactured by the company as well as control switches, instantaneous control relays, hesitating control relays, lockout relays and undervoltage relays. It also contains wiring diagrams for various setups of electrically operated switchgear.

The Electric Shop of Lusk, Wyo., has been purchased by Lyle Berry who plans to move the establishment to a more advantageous location on the main business street of the town. The shop was formerly owned by Neal C. Rowell.

The American Spiral Pipe Works, Chicago, manufacturers of Taylor's spiral riveted steel pipe, has recently issued a new catalog describing its products. The pipe is extensively used on high pressure hydroelectric installations and many such installations are photographically featured in the catalog. Several pages have also been devoted to an excellent collection of hydraulic tables and charts.

The Ivanhoe-Regent Works of the General Electric Works has recently published a sixteen-page illustrated booklet entitled "Lighting Recipes for Every Room in the Home." The booklet, which is printed in color, depicts the various uses of decorative glassware for home lighting. It is designed for distribution to the consumer with the idea of creating a desire for better lighting in the home. It is one of the most attractive pieces of sales literature to be published by the lighting industry.

The Seattle office of the Electric Storage Battery Company will begin the making of Exide batteries for the Northwest district in the near future, George D. Luther, Seattle manager, announces.

The Walker Electric Truck Company has established offices in Portland at 216 United States Bank Building, with L. L. Morgan as district manager. The new offices were established as the result of a visit to the Northwest by J. J. Canavan, Pacific Coast distributor for the truck. One of the first orders received at the new office was from the Log Cabin Baking Company of Portland for 9 electric trucks.

M. R. Price, proprietor of the Reliable Electric Company, has taken over the East Denver Electric Company at 2720 Larimer St.

The Westinghouse Electric & Manufacturing Company has moved its Portland offices from the Northwestern Bank Building to the new Porter Building at Fifth and Oak Sts. The change was necessitated by the increase in the volume of business and the enlarged sales staff of the office.

The Pacific Electric Manufacturing Company, San Francisco, has leased additional floor space of approximately 15,000 sq. ft. in a building adjoining its present headquarters. The new space will enable the company to increase its manufacturing facilities so as to adequately care for the large volume of new business which it is receiving.

Schweitzer & Conrad, Inc., Chicago, manufacturers of high voltage protective and switching equipment, have recently published Bulletin No. 203, describing the outdoor bus supports manufactured by that company.

The Ross Electric Appliance Company, Inc., Seattle, has been incorporated for $100,000, with A. E. Ross, G. E. Ross and F. L. Kerzie incorporators.

George D. Engle, Los Angeles representative of the National Conduit & Cable Company, recently reported the sale of 50,000 ft. of trolley wire to the Los Angeles Railway Company.

A new electrical shop, specializing in lighting fixtures, has been opened in Denver by the Sullivan & Gunther Electrical Company at 559 East Colfax Avenue.

The Baker Electric Company, one of the Thor dealers in Denver and formerly located in the Royal Market in that city, has moved to larger quarters at 34 Broadway.

The latest addition to the ranks of the manufacturers' agents in Denver is the Ormor Sales and Supply Company, recently organized by C. W. Orr and W. H. Moore. Several lines of electrical supplies and machinery will be handled.

R. G. Nathan, formerly one of the members of the Crooks-Nathan Household Appliance Company of Denver, has organized the Nathan Appliance Company with offices at 305 Commonwealth Building in that city. The complete line of washing machines and equipment produced by the Voss Bros. Manufacturing Company of Davenport, Iowa, will be featured.

The electric cooking school recently conducted in Pueblo, Colo., by the Edison Electric Appliance Company in conjunction with the Southern Colorado Power Company and one of the local newspapers has proven very productive, judging from the sales reports of Hotpoint-Hughes automatic ranges placed by A. R. Wooley and Jack Pheester. A follow-up campaign is now being staged by the Westinghouse Company through its merchandising specialist, M. E. Lanning. As soon as electric cookery has been introduced in Pueblo, similar campaigns will be featured in other towns of the Arkansas Valley served by the Southern Colorado Power Company.

Lighting fixtures and parts manufactured by the Art Metal Spinning Works were recently displayed in the windows of the Denver Gas & Electric Light Company. A new department has been established in the former company by Harry Smith, the manager, for the production of a popular priced line of luminaires.

The Sharpe Electrical Appliance Company has been incorporated in Denver by Elvin C. Sharpe, Bertha A. Harris, and W. C. Danks, and a new retail store has been opened at 1735 California St. Industrial heating equipment and electric smelting furnaces also are manufactured and sold by the company.

E. A. Van Gundy, J. J. Swords, and **W. S. Townsend** of Denver have incorporated the Fjord Washing Machine Company and will shortly place this product, a portable washing machine, on the market.

C. H. Kurz has been appointed to succeed Dyer Thomas as the manager of the Federal Electric Company in Denver, the latter having been transferred to Detroit as sales manager of the company at that place. New quarters have been established for the Denver office at 1073 Broadway.

The P. A. Geier Company, in a new booklet on the Royal Vibrator, emphasizes the all-around usefulness of electric massage. This manufacturer points out that the trade in general hardly appreciates the fact that the vibrator has a wide field of usefulness, in the home as well as in the beauty parlor, the doctor's office, the barber shop, clubs, and gymnasiums.

INTRODUCING MISS MILDRED DE LONG

Some time ago we instituted a fishing contest in this column which was productive of much entertainment and several good pictures. Emboldened by the success of this contest, our Denver correspondent has suggested that we run a beauty contest of eye-pleasing damsels within the electrical industry. As evidence of his good faith he has submitted the above photograph and dared us to run it. Miss De Long represented the Denver Gas & Electric Light Company in the princess revue, featured at the recent industrial exposition of the Colorado Manufacturers' Association. Our correspondent informs us confidentially that "she is one good-looker—the queen of the belles in the central station and very popular"; also that he was married.

Trade Outlook

Salt Lake City

General improvement in business conditions is in evidence in practically all parts of the Intermountain territory.

An accurate index of the favorable condition of the metal mining industry is the activity of the large machinery companies of Salt Lake City. Large increases in business are reported by all of such firms. Up to May 1 $2,500,000 in dividends had been paid by metal mining companies in the state of Utah so far this year, and the grand total of disbursements has reached more than $237,000,000.

Considerable road-building work is outlined for this year, some of which has already begun. The Union Pacific Railroad will pursue an aggressive course this summer in the construction of feeder lines throughout Utah and Idaho, and the Denver & Rio Grande contemplates spending not less than $1,000,000 in improving its shops and roundhouse in Salt Lake City.

Electrical jobbers report business in a much healthier condition than last year, with prospects for the remainder of this year exceedingly good. Electrical retailers are pushing seasonal merchandise with fairly good results. Contractors are securing considerable business on account of new home-building. Wholesale and retail trade, in general, in Salt Lake City and surrounding territory continues to show a marked improvement. Another very encouraging feature is the decided improvement in collections and credit conditions.

Seattle

With 20 per cent of the mills in the Northwest operating on a two-shift basis, and logging camps turning out capacity production to meet the demand for logs, the lumber industry in the Pacific Northwest is in good condition. Demands for lumber from the Atlantic Coast, the export trade, middle west and California continue so heavy that many large plants are devoting their output entirely to supplying this need, and claim they can make as satisfactory profits as on local business. Building activities in the Puget Sound country are such as to create a wide demand for lumber products, while cargo business from all the cargo plants is exceptionally heavy.

Building activities in Seattle promise to be heavy during the spring and summer months, with plenty of money available at reasonable rates to provide for industrial and residence building. The real estate market is strengthening noticeably, and real estate is showing an advance in price.

Electrical business in Seattle is going ahead in stronger volume than for any year since 1918, according to reports of large supply houses, and volume of sales so far indicate that 1923 will compare favorably with the largest war-year's business. A movement toward stiffening in prices of certain goods is apparent. There exists a good demand for large equipment, such as is required by lumber mills and large industrial plants, including generators, turbines, and large transformers required in the industrial and lumber districts.

Los Angeles

A wonderful record for building operations was rolled up by the Pacific Southwest during March, 1923. Thirty-nine cities, including Los Angeles, reported permits issued for the month with a total estimated valuation of $33,785,413, as compared with $18,495,096 for March, 1922. Thirty-eight cities outside Los Angeles report a total of $12,591,326 for March as compared with $7,530,829 for the same month in 1922.

For the first quarter of 1923 the enormous total of $76,471,945 has been reported in the Pacific Southwest by 36 cities in January, 38 cities in February and 39 cities in March. This total, which includes Los Angeles, is 72 per cent greater than that for the first quarter of 1922. The total for all cities outside Los Angeles for the first quarter of 1923 is $31,937,031, which is a gain of 78 per cent compared with the total for the corresponding period last year.

Growth of bank clearings in Los Angeles is clearly shown by an increase in a five-day period of April, 1923, over the corresponding period in 1922. In the 1922 period the clearings were $75,983,572.69, while those for the same period in 1923 amounted to $127,005,279.99, or an increase of approximately $51,000,000, a gain of nearly 70 per cent.

Wholesale business remains good, particularly in the supply line, while manufacturers report large sales and excellent business. For the first half of April, electrical dealers report a slight reduction in business over the previous month, while radio sales have also fallen off to a small extent, but on the whole the outlook is extremely encouraging and business is far and away ahead of the same period last year.

Denver

Although business continues to prosper, there is an occasional precautionary note heard from the agricultural districts where the financial problems of the farmer have not as yet been satisfactorily solved. Credits have been improved in the rural sections but collections are slow. There is little new building being undertaken outside of the commercial and industrial centers and to these latter communities the boom of the past year is principally due.

Central stations are proving good customers but industrial concerns are leading in the placement of electrical orders at this time. Negligible reserve stocks are being purchased because of uncertain prices. All forms of equipment containing copper, with the exception of switches, have jumped rapidly in price and even further increases are anticipated before any reaction will manifest itself in this part of the country.

There is plenty of work for everybody. Skilled building craftsmen are commanding wartime peak wages and the supply of ordinary labor is low. Considerable trouble is anticipated for the crop season in securing the necessary hands. Government investigations indicate a "healthy and robust" employment condition.

Electric ranges are moving well in some parts of the state and there is a steady demand for appliances. Special campaigns are being featured in nearly all the larger cities. Radio is solidly holding its own.

San Francisco

The building industry continues very active, and the orders being placed for lumber exceed production by from 25 to 40 per cent. Construction activities are mainly in the form of new industrial establishments, hotels, apartments, office buildings and a steady stream of moderately priced residences. Materials are high with shortages in some commodities. Electrical contractors report an increasing amount of business each month.

Dealers' business is better with a steady movement in larger household appliances. Considerable stimulus has been added to the radio industry by a Radio and Electrical Exposition held during the past month. Electrical dealers also report a favorable reaction from this event.

Plans are being formulated for an active appliance campaign early in June, when the California Electrical Cooperative Campaign will conduct the second annual June Bride Week. Many dealers disposed of large quantities of household and table appliances during a similar campaign last year. A second electrical home will be opened to the public early in May and its showing is expected to have a favorable reaction for both contractors and dealers.

Portland

The lumber industry, which forms the backbone of the industries of the Northwest, is experiencing a tremendous activity. Many mills are running 16 hours, and a few 24 hours. During the week ending April 14, the production at the mills was 25 per cent above normal, new business equal to production and shipments 5 per cent above new business. With such a situation it is evident that stocks are not accumulating. About 40 per cent is moving by water to the Orient, Australia, California and Atlantic ports.

Building construction continues at a high rate, though there have been increases in the cost of both labor and materials. Office and retail store space in Portland is becoming hard to find and a large amount of downtown building is in progress.

Conditions outside of the cities are not prosperous, and as a consequence the stock raiser and farmer are not buying actively. Weather conditions have favored spring planting.

Electrical jobbers report stocks in fair shape, with the exception of conduit. Sales of ranges, cleaners and washers are good. Prices are firm. Collections are said to be slightly poorer.

Construction News

Bridges

Ore., Oregon City—Tobin & Pierce, bridge contractors of Portland, have been awarded the contract for the erection of the Pudding River bridge near Aurora on their bid of $75,545.

Ore., Hood River—Construction of an interstate bridge across the Columbia River, connecting Hood River and White Salmon, will begin immediately after the June freshet this year. Bonds to the amount of $300,000 have been underwritten and of the preferred stock of $175,000, $75,000 will be taken by local capital. The new bridge will be an important link in the highway between Oregon and eastern Washington. A road connecting Glenwood, in the northern part of Klickitat County, is under construction. It will bring Yakima 70 miles closer to the Columbia River highway. Leslie Butler, chairman of the board of the Butler Banking Company, has been named chairman of the board of the new bridge committee, and E. O. Blanchar, president of the First National Bank, will be the county's other director. Victor A. Johnson of Portland, is general agent of the new corporation.

Ore., Salem—Contract for bridge over the Klamath River near Spencers, on the Ashland-Klamath Falls highway in Klamath County, has been awarded at a cost of $41,510 to the Union Bridge Company of Portland.

Utah, Salt Lake City—The state road commission recently awarded to the Security Bridge Company contract for the erection of a bridge at Wildside, Carbon County, on the main state highway eastward by way of Price and Green River to the Colorado line. The bridge will have a 100-ft. span, will be of steel on cement ruble masonry, with abutments on piling and the approaches surfaced with gravel. The Security Company was the lowest of eight bidders, the figure being $31,753.67, including about $10,000 worth of materials furnished by the state, and 10 per cent additional for engineering, inspection and contingent charges. The engineers' estimate corresponding was $38,679.60, which was exceeded by two of the bids.

Wash., Kelso—Contract for construction of 2,200 ft. of trestle approaches to the proposed Cowlitz bridge, has been let to Hart Construction Company, Tacoma. Bridge will be of steel, 800 ft. long.

Wash., Everett—Snohomish county commissioners, Ross D. Alverson, county engineer, will erect a steel bridge across Stillaguamish River near Haller, to cost $35,000.

Wash., Olympia—The state highway department will receive bids until July 31 for the La Center bridge, over the south fork of the Lewis River, near Woodland. The structure will be 1,400 ft. long, of reinforced concrete construction, and will consist of one main arch over the distance across the river, while the remainder will be of short spans. A roadway 20 ft. wide is provided, with 4-ft. sidewalks on both sides. Structure will cost $100,000 and be built under the supervision of R. M. Gillis, district highway engineer, requiring one year for its completion.

Buildings (Industrial)

Calif., Orland—Plans for the establishment of a lumber yard, box factory and planing mill here are being completed by W. T. Hilliard, of Paskenta.

Calif., San Francisco—A. J. Rickey and W. F. Schimpferman are planning the erection of a class C building to be used as a laundry, on the north side of 14th Street, west of Howard, to cost $38,550.

Calif., San Francisco—Hale Bros., Inc., have prepared plans for an 8-story warehouse on the south side of Stevenson Street, west of Fifth, to cost $40,000.

Calif., Oakland—Capitalized at $100,000 with shares at $10 each, the Cox Cylinder Works has filed articles of incorporation. The directors are H. C. Cox, R. B. Ryan and Fred Wettstein. The company plans to have a cylinder plant in Oakland.

Calif., Los Angeles—The California Cyanide Company is planning to erect a $1,100,000 factory near Cudahy City. Engineers of the Air Reduction Company will draw plans. Work will start at once.

Calif., Santa Monica—Haley Bros. are planning to erect a $100,000 factory on Colorado and 14th Sts. This company will manufacture sashes, doors and flooring.

Colo., Denver—Stenmark & Peterson, general contractors, have been awarded the contract for constructing a 3-story concrete public garage at 1828 California Street, in the downtown section, at a figure close to $75,000.

Utah, Salt Lake City—The Linde Air Products Co.-Pacific Coast is planning the erection of a factory in Salt Lake City, work to commence the coming summer. The total investment, including site, building and equipment will be more than $500,000. This company manufactures oxygen and other products of air, used chiefly for welding, cutting and similar purposes.

Wash., White Salmon—The White Salmon Box & Lumber Company at Bingen has started erection of a second factory to care for the heavy orders this season. The new structure will be 175 x 50 ft. The plant will be electrically driven and will employ two shifts.

Wash., Seattle—The Federal Pipe & Tank Company has completed plans for a factory for the manufacture of wooden tanks and wood stave pipe, in Seattle. Structure will be 150 x 72 ft. in size, completely equipped.

Wash., Spokane—Inland Empire Paper Company has under way extensive improvements to its plant, to cost $100,000. Work includes development of office protection equipment and yard trackage, and construction of ten modern homes for its employes.

Wash., Spokane—The Spokane Refinery Company, organized with capital of $200,000, plans erection of oil refinery with daily capacity of from 500 to 1,000 bbl. of crude oil. J. P. Graves, Spokane, heads the project.

Wash., Bellingham—The Western Woodworking Company has begun work on a new plant to cost $25,000, to manufacture sash and door products.

Wash., Tacoma—The Tacoma Gas & Fuel Company will start within 30 days erection of a plant to cost $250,000, and to have daily capacity of 5,000,000 cu. ft. Two buildings, one 80 x 100 ft. and the other 30 x 80 ft., are included in plans.

Wash., White Salmon—The White Salmon Box & Lumber Company will erect a second factory, to be 175 x 50 ft., electrically driven throughout.

Wash., Tacoma—The Tacoma Lumber Company will construct a lumber manufacturing plant here, with daily capacity of 70,000 ft. Welles Wheeler heads the company. The Western Lumber Manufacturing Company, Tacoma, will also erect a lumber mill with daily capacity of 100,000 ft.

Wash., Seattle—Henry Disston & Sons, Inc., has leased a site 120 x 150 ft., on which will be erected a factory and warehouse costing $60,000, providing employment for 150 men. With the completed plant, Seattle becomes the Pacific Coast headquarters of the Disston Company. Local plant will specialize in manufacture of planer knives, made by special process.

Dams

Calif., Oroville—Contract for the construction of the Lost Creek dam of the Oroville-Wyandotte Irrigation District has been awarded to Lord & Thomas, Montana contractors, on a bid of $58,761. The dam was designed by L. Jorgensen of San Francisco.

Highways

Ore., Eugene—Work will be resumed at once on the big project of building a highway over the Cascade Mountains by way of the McKenzie Pass, according to the announcement by the engineers of the United States Bureau of Public Roads. The government has about 20 miles of the highway to build to complete the project which was started three years ago. The total estimated cost will be about $1,000,000. Eight construction camps will be established at once and 200 men will be employed.

Ore., Portland—Contracts have been awarded by the state highway commission as follows: Dairy Creek Fill, Washington County, to Otto Brose of Hillsboro, $21,760; .024 miles embankment construction. Cow Canyon section of the Dalles-California highway in Wasco County, 7.72 miles broken stone surfacing, to Montague-O'Reilly Co. of Portland for $38,458. Hillsboro-Forest Grove section of Tualatin highway in Washington County, bridge over Dairy Creek near Hillsboro, to W. D. Hoffman of Amity for $28,720. McKay creek-Pilot Rock section of Oregon-Washington highway in Umatilla County, bridge No. 996 over McKay creek to the Union Bridge Company of Portland, for $24,546. Lewis and Clarke bascule bridge—the bid of the Pacific Bridge Company was satisfactory but was referred to the highway engineer for settlement of the control systems. The bid was for $170,836.

Ore., Astoria—The Clatsop County Court has awarded contracts to McLean & Williams of Astoria for paving one mile of the market road and five miles of the main Nehalem highway for a total of $136,603. The pavements will be of concrete, 6½ in. in thickness, and are to be completed by Oct. 1.

Ore., St. Helens—The St. Helens-Pittsburg Market road is to be completed at a cost of $40,000, according to Roadmaster Ellerton. This road will connect St. Helens with Nehalem with a 16-ft. road and the maximum grade will be 5 per cent.

Ore., Imbler—Work on the $60,000 viaduct between Imbler and Elgin is to be completed by May 1. A 12-ft. cut is required for about a quarter of a mile. New rock crushers are being filled up at Rhinhart to furnish roadbed material needed to complete the highway.

Wash., Olympia—The McHugh Construction Company, Seattle, on a bid of $147,559.88, received contract for paving 4.71 miles of Pacific Highway, from Castle Rock to Laughlins, in Cowlitz County. Contract for grading and paving of 5.53 miles of Pacific Highway, from Laughlins to Neals, Cowlitz County, has been let to McHugh Construction Company, Seattle, on a bid of $180,111.06.

Wash., Seattle—King County Commissioners have revised their plans for the Dockton-Molita road on Maury Island, and new plans provide for constructing the Hill road, at a cost of $30,000.

Irrigation

Wash., Wenatchee—The Riverside Irrigation District has been formed, bonds voted and a satisfactory offer made for the bonds, which means that the 4,000 acres above Riverside will come under water next year. F. B. Brock, secretary of the project.

Wash., Centralia—Excavation of approximately 200,000 cu. yd. of earth is involved in a contract upon which bids are to be taken immediately by Commissioners of Drainage and Diking, District No. 1, Lewis and Thurston Counties. About 4,000 acres of land will be drained near Centralia. Guy Smith, Centralia, secretary of the district.

Wash., Mt. Vernon—Petition for a drainage district in the Padulla Bay district, from Samish Point to Hat Island, and from Hat Island on the mainland north to Indian Slough, has been granted by Skagit County Commissioners. Nearly 9,000 acres of tideflats will be reclaimed, costing $1,000,000. Plans provide a main enclosing dike of an average height of 20 ft., dike to be seven miles long by 20 ft. wide at the top and 100 ft. at the bottom. Project will involve a year's work, and was petitioned for by 273 residents of district.

Power Plant Equipment

Colo., Denver—A permit has been taken out by the Denver Tramway Co. for the construction and equipment of a new substation at 3555 Gilpin St., near the east side car barns.

Eugene, Ore.—Plans are being made by Ellis F. Lawrence, dean of the School of Architecture, for a new power house to cost $75,000 which will replace the one condemned by the state fire marshal. The plant is expected to be ready for use with the beginning of the fall quarter of the University of Oregon.

Ore., Baker—The Eastern Oregon Light & Power Company is to spend $100,000 in 1923, according to Manager J. P. Lottridge, who has been in Milwaukee in conference with the directors of the company. A large steam plant is to be built in Baker, having a capacity of 1,500 hp. The plant is to be completed by Oct. 1.

Logan, Utah—The city of Logan is to hold a special election on May 15 for the purpose of submitting to the qualified voters the question of incurring a bonded indebtedness of $300,000 with which to rebuild its municipal power plant in Logan canyon.

Wash., Tacoma—The city light's annual requirements in distribution transformers provide for an expenditure of $75,000, including purchase of 180 oil-immersed, self-cooled transformers, ranging in size from 25 to 333 kw.

Wash., Seattle—The Board of Public Works has awarded to W. R. Hendry Company, Hoge Building, on their bid of $121,679.08, contract for furnishing transformers for the municipal light department.

Power Projects

Calif., Visalia—The 1923 budget of the Southern California Edison Company is approximately $1,000,000, according to recent announcement by R. I. Carruthers, district manager. About half of this amount will be spent in the Visalia district proper, while the remainder will be used in the High Sierra east of Visalia on transmission construction. The Visalia budget includes $220,000 for the new Venida substation, $100,000 for a new substation in Kings County, $20,000 for a store in Visalia, $122,000 for line extensions and $30,500 on renewals.

Wash., Seattle—Contract for construction of the transmission line to bring Skagit current to Seattle was awarded to the NePage-McKenney Co., on a bid of $268,000.

Wash., Ridgefield—The contract for the construction of the high power line to be built by the Clarke County Water, Light & Power Company was awarded to the George Burdick Company of Portland. The company is to supply light, power and water to Orchards, Brush Prairie and Battle Ground. Construction must be done by Sept. 1.

Wash., Spokane—Issuance of a permanent Federal license for the development of the Kettle Falls hydroelectric project by the Washington Water Power Company is expected shortly after the preliminary survey work is completed about May 15, according to D. L. Huntington, president. The work on the dam and power house at Kettle Falls will start immediately after the Federal license is issued. The first step will be the construction of several miles of railway from the main line to the power site, and it is estimated that the first unit will take two years to build, and should be in operation in the summer of 1925.

Wash., Olympia—Application has been received from Sterling B. Hill for permit to divert 1,000 sec.-ft. of water from the south fork of the Nooksack River and to construct a 32,000-hp. hydroelectric plant. Project would cost $2,000,000.

Wash., Everett—Puget Sound Light & Power Company on April 16 began work on the power line extension between Hartford and Granite Falls, completion of which will enable the company to abandon the hydroelectric plant on Pilchuck Creek.

Wash., Kelso—The Long-Bell Lumber Company has awarded to the Charles C. Moore Company of San Francisco, contract for construction of the company's large power plant, which will supply power to the mills, the city of Longview and logging camp, and will have an ultimate development of 20,000 hp. Work will cost about $2,000,000.

Wash., Spokane—The Grangeville Light & Power Co., with general offices in Spokane, has completed its preliminary surveys for a new power plant at Brucet's eddy on the north fork of the Clearwater River, four miles from Orofino, Idaho. Two power sites are being considered, an upper and a lower, about ¾-mile apart. J. Wood, engineer of Spokane, is in charge of field investigations.

Railways

Mont., Great Falls—Contract for shop construction work, involving an expenditure of more than $50,000, has been let by the Great Northern to Pappin & Son of this city. The contract includes the remodeling of the local car repair shop and the construction of a new wood mill. According to Engineer E. E. Adams, this $50,000 is but a part of $1,500,000 which the Great Northern is spending in Montana this year. Improvements include double tracking on the main line and the construction of a considerable number of new bridges and culverts at various points.

Ore., Marshfield—A logging railroad, costing $40,000, is to be built by the Western White Cedar Company connecting the south fork of the Coquille and up Dement Creek. The company will tap about 60 million feet of timber.

Ore., Portland—$40,000 is being expended by the Portland Railway, Light & Power Company in constructing rails on Hawthorne Avenue from Grand Avenue to East 11th Street, as announced by F. I. Fuller, vice-president of the company.

Wash., Spokane—Fred Herrich, lumberman and timber operator, will begin the opening of the timber district in the Malheur National Forest. The cost of building a railroad into the project and equipping it with locomotives and rolling stock will run slightly in excess of $1,000,000. The railroad will run from Burns, Ore., to Crane and Seneca, Ore., adjacent to the timber area purchased. The sawmill investment needed, exclusive of a possible box factory and dwellings, has been estimated at $525,000.

Wash., Kelso—Contract for grading 30 miles of railway from Longview to a point west of Vader for the Longview, Portland & Northern Railway has been let to Twohy Brothers of Seattle and Portland, the contract price exceeding $1,000,000.

Streets and Sewers

Calif., Yuba City—The Latourette-Fical Company and Michael Murphy, of Sacramento, were successful bidders on the first step in the construction of a sanitary sewer system. The Latourette-Fical Co. bid on the sewage reservoir and superstructure was $13,112. Mr. Murphy will lay the 12, 14 and 16-in. sewer pipes from Sumner to B Street, including the manholes, for $15,770. Figures on the balance of sewer pipe and other equipment were rejected as the bids were considered too high. New bids will be called for to be opened May 7.

Calif., Chico—The Chico Contracting Co. has been awarded a paving contract involving $232,000, by the city trustees.

Calif., Hanford—A paving contract for seven blocks of asphalt pavement on Ivy Street from Brown to Park Ave. was awarded recently by the city trustees to the California Construction Co. of Fresno, in the sum of $40,000.

Ore., Portland—Three street improvement contracts are as follows: Improvement of Tibbetts Street from East 19th St. to a point 300 ft. east to the Municipal Paving Plant, $1,844; improvement of Simpson Street, Union Avenue to East 9th St., to A. D. Kern for $8,283; district improvement of East 10th, East 9th, East 21st, East 22nd and East 33rd, Regents Drive and Ridgwood Avenue to A. D. Kern for $35,383.

Ore., Corvallis—Bonds in the amount of $50,000 have been voted by the city council for the extension of the Fillmore Street sewer westward to the city limits.

Wash., Centralia—Contracts for paving approximately 34 blocks of city streets have been awarded to R. G. Stevenson, 1327 North 34th Street, Seattle, on his bid of $102,640—$1.99 per sq. yd. of concrete surface. The Albers Brothers Construction Company gets award of contract amounting to $14,520, involving 5,000 yd. of paving.

Wash., Tacoma—Cost of resurfacing Yakima Avenue, from Division to Steele Streets, with concrete curbs, is placed at $40,000. Work will proceed shortly.

Wash., Kelso—City clerk will receive bids until May 8 for grading, paving, and sidewalks in L. I. D. No. 45, the work including 9,842 cu. yd. of excavation, 9,922 lin. ft. of concrete curbs, 33,150 sq. yd. of concrete sidewalks; 14,069 sq. yd. of pavement.

Wash., Seattle—Paving of Jackson Street and adjoining streets and avenues south of Yesler Way, between First and Fourth Avenues, has been recommended by the streets and sewers committee, the work to cost approximately $500,000. The paving of Wilson Avenue and Gennessee Street in Rainier Valley is also recommended, the cost of this work being $250,000. Ordinance will be introduced at once calling for both of above projects.

Wash., Kelso—Contracts for sewer and water system installations in Longview have been awarded as follows: Bardsen & Company of Butte, Mont., installation of the sanitary sewer system. J. D. Hanley of Portland obtained the contract for the storm sewer installation. James Payne, who is installing the sewer and water systems in the industrial area of Longview, obtained the contract for the water system installation. The contracts total $200,000, the Long-Bell Company supplying all material.

Wash., Seattle—Low bid submitted for concrete walks on Atlantic Street was that of Paduano & Crisman, who bid $31,532. Work involves 17,300 sq. yd. of concrete walks. Low bid for paving Findlay Street, estimated to cost

$37,000, was submitted by Coluccio & Erickson, at $43,030, the lowest of seven bids. Work involves 4,000 cu. yd. of grading, and 14,225 sq. yd. of 6-in. concrete paving. Contract for grading, et al. in Brandon Street, has been let to George A. Banderet, for $36,554. Work involves 24,700 cu. yd. of grading. Contract for grading and paving 9th Avenue South, et al., part of the Beacon Hill regrade project, has been let to Puget Sound Bridge & Dredging Company, on their bid of $494,968. This work involved 750,000 cu. yd. of excavation, 7,000 ft. concrete curb, and 23,050 sq. yd. of 8-in. concrete paving. Contract for grading the Golf Heights city property, part of the Beacon Hill regrade project, has been awarded to the Puget Sound Bridge & Dredging Company, on a bid of $74,464. This work involves 646,000 cu. yd. of excavation. All bids for the proposed tunnel under First Avenue South, estimated by the city engineer to cost $80,000, have been rejected. Lowest bid submitted was that of J. A. McEachern, Colman Building, $123,665. New bids will be called. Sewers to cost $121,227 are planned for 30th Avenue South, et al., by the Board of Public Works. Estimated cost of grading and paving of First Avenue South, proposed, is placed at $125,447.

Waterworks

Calif., Chico—The proposition to vote a $475,000 bond issue to acquire three privately owned water systems here and for the amalgamation and enlargement of these systems as a municipal water supply was defeated by the voters at an election on April 9.

Calif., Long Beach—City council has authorized the expenditure of $100,000 to enlarge the city's water system. Work will include the drilling of two additional wells on the city's water lands, reservoir construction, and the laying of additional mains to East Long Beach, North Long Beach and Belmont Shore; 8,000 ft. of 10-in. pipe will be laid at a cost of $24,000; 6,000 ft. of 8-in. pipe will be laid at a cost of $16,000. The Western Reinforced Concrete Pipe Company was awarded contract for furnishing 5,001 ft. of 30-water pipe for the water department, at a cost of $13,002.60.

Ore., Astoria—The water system, which was recently destroyed in the great fire, is to be restored at a cost of between $37,000 and $40,000. O. A. Kratz is city manager in charge.

Wash., Everett—T. M. Morgan, Everett, on a bid of $150,725, received contract for building the 20,000,000-gal. reservoir for the city water department. Excavation necessary before lining the basin is estimated at 175,000 yd. Contract for laying north and south water main from the new reservoir to California Street has been let to the Western Pipe and Steel Company, Seattle, on a bid of $51,962. Pipe will be 28 in.

Wash., Tacoma—City council has passed ordinance providing for replacing 2,508 ft. of 12-in. water main with 16-in. main, in East 11th Street, at a cost of $20,850.

Miscellaneous

Calif., San Francisco—Purchases of the Standard Oil Company amounting to more than $500,000 have been announced by Buckbee, Thorne & Co. An entire block in the North Beach district, bounded by Beach, Jefferson, Jones and Leavenworth Sts., 275 x 412.5 ft., was acquired and will be immediately improved as a distributing center. The Standard Oil Company will install fuel oil bunkering facilities, having leased a portion of pier 43 for this purpose.

Calif., Los Angeles—N. R. Powley, commercial superintendent of the Southern California Edison Company, stated that $14,000,000 will be spent in the enlargement of the Los Angeles system, 500,000 new automatic telephones will be put in. New office buildings will be built in Huntington Park, Hollywood, Vermont and Adams districts.

Calif., San Bernardino—The Arrowhead Portland Cement Company is planning to erect a $1,400,000 cement plant along the Foothills and north of San Bernardino and east of Verdemont. Wm. F. May, manager.

Ore., Portland—The Hauser Construction Co., of this city, Eric V. Hauser, president, has been awarded contract to prepare site for an oil storage station at the U. S. Naval Station, Pearl Harbor, Hawaii. The contract includes extensive excavations and construction of retaining walls; price, $1,200,000. The award was made by the U. S. Bureau of Yards and Docks, Washington, D. C.

Buildings (Miscellaneous)

Calif., Los Angeles—Stores and Offices—Architect Edwin Bergstrom, 1128 Citizens National Bank Building, is preparing working drawings for a 14-story and basement class A store and office building to be erected on the east side of Broadway south of 2nd Street, for Richard Garvey and associates. It will contain stores in the first story and 377 offices in the upper stories; steel frame construction; brick filler walls, pressed brick and terra cotta facing, plate glass windows, fire escapes, reinforced concrete floors, three elevators, steam heating, vacuum cleaning, marble and tile work.

Calif., Los Angeles — Hotel — Architects Eldredge & Jewell, 425 Pacific Finance Building, have completed plans for a 4-story hotel building to be erected at 825 W. 11th Street, for Melville Dozier; to contain 100 rooms. Brick steel joist construction, reinforced concrete, slab floors and roof, 70 x 110 ft., pressed brick facing, terra cotta trimmings, hollow tile partitions, cement floors to be carpeted, composition roofing, tile baths, automatic electric elevators, steam heating, metal lath, ornamental iron, steel sash, wire and plate glass, terazzo floors, part basement, interior telephone system; $125,000.

Calif., Los Angeles—School—Architect Arthur S. Heineman, 831 San Fernando Building, is preparing plans for a new school building to be erected at 3rd Street and Las Palmas Avenue for Cumnock School for Girls. It will be 2-story, English style, approximately 250 x 60 ft., built around a court, and will contain an auditorium to seat 800 people, 12 class rooms, kitchen and dining room, and 50 dormitory rooms; brick and concrete fireproof construction, slate roofing; $200,000.

Calif., Los Angeles—Stores—Architects Morgan, Walls and Morgan, 1124 Van Nuys Building, are preparing plans for a 2-story, class C mercantile building, to be erected at 7th and Corondelet Streets, for Mrs. McKinley. It will be occupied by Gatch & Hill, decorators, and Philip Levy, confectionery. Dimensions, 50 x 100 ft., brick walls, plaster exterior, cast iron trim, comp. roofing, cement and wood floors.

Calif., Sacramento—Store—Plans for the erection of a 3-story and basement structure to cost approximately $850,000 for Weinstock, Lubin & Company, have recently been announced by John A. Clecak. Cahill Bros. of San Francisco will be the contractors. The building will be a class A structure to be used entirely by the department store company which has signed a lease for a term of years.

Calif., Marysville—Plans for the proposed memorial auditorium to be built by Mrs. Phoebe Rideout at a cost of $120,000 have been announced by Miss Julia Morgan, of San Francisco, architect for the structure. The building will be located on E Street between 8th and 9th and will be built under agreement with the Yuba County Board of Supervisors.

Calif., Sacramento—Hotel—Contract has been signed with Cahill Bros., of San Francisco, for the construction of the Hotel Senator at Twelfth and L Sts., to cost approximately $1,500,000.

Calif., San Francisco—Apartments—Two new 5-story and basement brick buildings to contain 24 apartments and to cost $50,000 each, have been planned by the Acme Investment Co. The buildings will be located on Leavenworth Street, north of O'Farrell.

Calif., Napa—Gymnasium—Contract for construction of the high school gymnasium has been awarded to Larsen & Seigrist on a bid of $47,651.

Calif., Los Angeles—Architects Dodd & Richards, 905 Brack-Shops Building, are preparing plans for a class A office building to be erected at the southwest corner of 6th Street and St. Paul Avenue, for Dr. Rex Duncan, 1151 W. 6th Street. It will be 80 x 165 ft., reinforced concrete construction, pressed brick and terra cotta exterior, plate glass, marble and tile work, elevators, steam heating; $500,000.

Calif., Pasadena — Bank—Offices — Architects Curlett & Beelman, 408 Union Bank Building, have been commissioned to prepare plans and specifications for a class A bank and office building, at the southeast corner of Marengo Avenue and Colorado Street, Pasadena, for the Pacific Southwest Trust & Savings Bank. It will be 8-story, basement and sub-basement, 146 x 214 ft., steel frame construction, pressed brick and terra cotta facing, marble and tile work, etc.; $1,000,000.

Calif., Los Angeles—Offices—Architects Walker & Eisen, 325 Pacific Finance Building, are preparing plans for a class A office and loft building to be erected on Hill Street south of 8th Street, for I. C. Freud. It will be 13-story, 60 x 159 ft., reinforced concrete construction, pressed brick and terra cotta facing, plate glass, marble and tile work, elevators, steam heating; $600,000.

Colo., Denver—Apartments — A brick apartapartment which will be the largest building in University Park, excepting those on the campus of the University of Denver, is being planned by Aaron M. Gove, local architect, for E. M. Curtis. It is being arranged especially for the use of students and when completed will cost over $100,000.

Colo., Denver—Apartments—Construction has been started on a large downtown apartment house by Dr. J. Hamilton Jones, the finished cost of which is estimated by A. D. Wilson & Co., builders, to be about $125,000. The building will contain 38 five-room apartments and three stores on the ground floor. Elevators, both passenger and freight, will be installed, also the latest lighting, ventilating, and refrigerating equipment.

Colo., Fort Collins — School — Bonds in the amount of $330,000 were authorized at a special election for the construction of a new high school. Although the site has not been selected, the plans are under way and when completed the building will be of the latest design and equipment.

Ore., Portland—Apartments—A 4-story apartment house is to be erected by Herbert Gordon, costing $150,000, on the northwest corner of 17th and Morrison Streets. Two-story apartment building to be built by David Liebreich, costing $45,000, at 412 Sixth Street. A 4-story apartment house costing $100,000 at 11th and Jefferson Streets is planned by Isabella M. Newton.

Ore., Astoria — Hotel—Stores — Another new building to be erected in the burned area will be at 11th and Commercial Streets and built by John H. Luukinen and Walter Harrison. The structure will be two-story concrete, covering 100 x 100-ft. site, and housing stores on the first floor and a 40-room hotel on the second floor. The cost is estimated at $75,000.

Wash., Seattle—School—M. Hoard & Company, Pantages Building, has received contract for St. Margaret's School, to be two stories high, 100 x 168 ft., containing 18 rooms, and costing approximately $85,000.